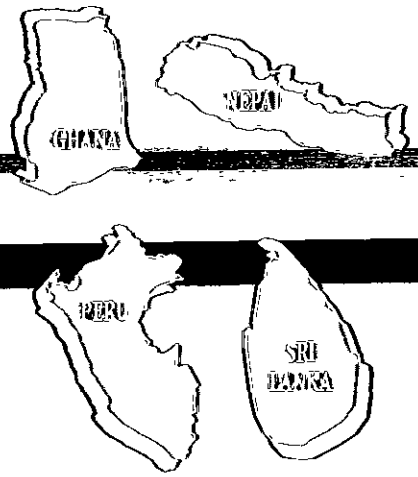

A Study of Factors Influencing Operational Issues for Iron Supplements for Infants and Young Children

Alfzon Draper and Penelope Nestel

Editors

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Edited by

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1: INTRODUCTION

Alizon Draper and Paul Arthur

Background

Micronutrient malnutrition in infants and young children remains a major public health problem in developing countries. The focus has been on vitamin A and iodine deficiencies, although the prevalence of iron deficiency anemia (IDA) was reported to be more than 50% in many communities (Gillespie et al. 1991). In young children, iron deficiency and anemia can have adverse effects on cognitive performance, motor development, coordination, language development, and scholastic achievement that are not always reversible (Nokes et al. 1998). The World Health Organization estimated that anemia in infants and young children results in a permanent deficit of at least 5 IQ points below their normal nonanemic counterparts and their learning capacity is reduced by 10% during school years (WHO 1994). Despite these potentially long-term adverse developmental consequences of IDA in infants and young children, the problem has been largely neglected and few countries have a strategy for the control of IDA in young children. This situation is attributed to both the lack of accurate prevalence data, which means that IDA often goes unrecognized, and the lack of appropriate prophylactic iron supplements that are acceptable to mothers and easily dispensed to infants and young children.

In 1996 the United States Agency for International Development and the United Nations Children's Fund cohosted a meeting to review the available options and to identify appropriate delivery mechanisms for iron supplements to children below age 2 years (Nestel and Alnwick 1996). This age group was identified as the most vulnerable for IDA, particularly children between ages 6 and 12 months. Recommendations were made regarding appropriate formulations, dispensing methods, mode of administration, dose and regimen, and feasibility of a combined multiple micronutrient supplement. One formulation identified as requiring further research and development was a granular mineral and vitamin multimix (sprinkles) that could be added directly to complementary food; another was injectable iron for infants.

Although there are technical challenges to developing sprinkles and an appropriate form of injectable iron, there are also programmatic constraints, including the logistics of supplying the iron supplements, cost, and compliance. Unlike vitamin A and iodine supplements, which are generally administered semiannually or less frequently by health care providers through the existing health system, iron supplements must be administered by mothers or caretakers daily over a sustained period. Thus, ensuring compliance is critical to the success of a pediatric iron supplementation program.

Many compliance studies have been carried out in industrialized countries, but few studies have looked at factors influencing the acceptance and use of pharmaceutical products in developing countries (Homedes and Ugalde 1994, Nichter and Vuckovic 1994, van der Geest 1987). Only one study examined factors that may influence compliance in micronutrient supplementation programs (Pelto and Tuomainen 1996). Despite this, poor compliance is often stated to be a reason for the failure of prenatal iron supplementation programs (Cook and Reddy 1996). This, in turn, is often attributed to ignorance, illiteracy, scarce resources, and concern about side effects, although this has been rarely proved. Galloway and McGuire's (1994) review of prenatal iron supplementation trials concluded that social and cultural factors relating to health beliefs, cultural preferences, and use of health resources may be greater constraints to iron supplement use than concerns about side effects. Moreover, the nature of the user-provider relationship should not be overlooked. Gillespie et al. (1991) and Morrow (1990) also identified poor compliance as a stated reason for the failure of iron supplementation programs. Both reports recommended that qualitative research be carried out to identify the factors affecting compliance so that culturally appropriate delivery systems and communication strategies can be designed.

Anemia may go unrecognized because it is often chronic with nonspecific and vague clinical signs and symptoms; thus, there will be little motivation to treat or

prevent it. A few qualitative studies on maternal anemia have shown variable recognition, within local illness categories, of conditions correlated to IDA and associated with signs and symptoms of anemia, such as dizziness and fatigue (Agyepong et al. 1997, Moore et al. 1996, Williams et al. 1996, Ejidokun and Lovel 1993). Moore et al.'s study in Indonesia found that anemia recognition was poor and the symptoms of dizziness and tiredness were seen as a normal part of pregnancy. The other three studies conducted in Ghana (Agyepong et al.1997), Nigeria (Ejidokun and Lovel 1993), and Malawi (Williams et al. 1996) found that anemia was recognized and commonly described as a shortness of blood. In the Ghana and Malawi studies, however, shortness of blood was seen as only one possible disease of the blood and concern was expressed about having too much blood. In the Malawi study, women expressed concern about having too much blood as a possible consequence of taking iron tablets. This was a more potent source of anxiety than any concern about possible side effects, although overall problems with the supply of tablets was the main reason that they were not used. All three studies found that iron tablets were seen as only one possible treatment option. Alternatives included resort to traditional healers, such as herbalists; behavior changes, such as stopping flirting; and dietary changes.

Little attention has been paid to the sociocultural factors that may influence the use and nonuse of micronutrient supplements in developing countries. In relation to young children, only two studies were identified that examined the reasons women or caretakers did not follow the prescribed use of iron supplements for infants. Palti et al. (1987) investigated the feasibility and effectiveness of administering iron supplements through maternal and child health services in Israel. They found that although initial acceptance rates were high, with 89% of the children in the study receiving some iron supplements, only 26% of the mothers completed the full 9-month course of treatment despite constant encouragement. Adherence was assessed by mothers' self-reporting. The reasons given for not starting or for stopping supplementation varied and included whether the infant was breast-fed or getting an iron-fortified formula, acute illness, doctor's advice, side effects, refusal without reason, other, and unknown, but unfortunately these reasons were not explored in depth. Ciomartan et al. (1996) in Romania investigated the feasibility of using liquid ferrous sulfate distributed through primary health care clinics to improve the iron status of infants. The trial was designed to provide a 6-month course of treatment with a minimum of 3 months. Again, adherence was low; only 2% of the children received treatment for 180 days and mean treatment duration was 83 days, which was the explanation given for the smaller-than-expected improvement in hemoglobin levels.

Although there are a dearth of data on the acceptance and use of micronutrient supplements for children, ethnographic studies on household management of diarrheal illness have explored factors influencing the acceptance and use of oral rehydration therapy technologies. These studies showed the importance of understanding the existing knowledge, beliefs, and practices of mothers and other family members in relation to illness of the child and how these affect the acceptance and sustained use of oral rehydration therapy (e.g., Bentley 1988). Studies on the acceptability and use of childhood immunization services and malaria prophylaxis have also shown that the reasons for low coverage rates and poor compliance are complex. Indeed, they relate both to the health delivery systems and to the target population in terms of their sociodemographic characteristics and their culturally determined perceptions of health needs and problems, which also influence health-seeking behavior (Agyepong 1992, Heggenhougen and Shore 1986, MacCormack and Lwihula 1983). Understanding traditional illness categories, methods of treatment, and meanings attached to medicines is also important for promoting interventions effectively and avoiding potential misuse (MacCormack and Draper 1988).

Because of the interest in promoting iron supplementation programs for infants and young children and the lack of information on supplementing apparently healthy children over a sustained period, formative research was necessary to identify the social and cultural factors that may influence the acceptance and use of prophylactic iron supplements in this group of children. The wider issues that influence the use of health services and, therefore, access to iron supplements also needed to be explored. Williams et al. (1996) looked at factors that influenced women's use of iron supplements and concluded that two user behaviors are central to the success of an iron supplementation program: getting the tablets and then taking them. Besides poor compliance, the failure of existing prenatal iron supplementation programs has been attributed to poor access and use of services, with coverage rates often less than 50% of the target population (Gillespie et al. 1991). Low use rates have in turn been blamed on problems related to the lack economic and physical access and on a lack of awareness of benefits (Gillespie et al.1991). Many issues identified as important for the success of prenatal iron supplementation programs also apply to programs directed at infants and young children; thus, there is a need to better understand the broader health-seeking behaviors and patterns of resort in relation to child health and the constraints to using health services. The latter will have important implications for the appropriate formulation, regimen, and channels for distributing supplements.

The aims of this research project, therefore, were to explore behavioral and sociocultural factors that may in-

fluence the acceptability and use of iron (and multiple micronutrient) supplements for infants and children below age 5 years:

- investigate the awareness and understanding of mothers, other household members and caretakers, and health professionals regarding IDA in young children;
- investigate the health-seeking behaviors of mothers and other caretakers in relation to child health and medication, including the use of health services and factors that may constrain this;
- investigate traditional feeding practices with specific reference to young children and how these may influence the acceptance and use of iron supplements and different dispensing mechanisms,

The information gathered will form the basis for making recommendations regarding the suitability of iron supplementation in terms of its sociocultural acceptability and to identify factors that may constrain their use.

Theoretical Framework

The conventional definition of compliance is the extent to which a person's behavior for taking medication, following prescribed diets, or executing certain lifestyle changes coincides with medical or health advice (Haynes 1979). Central to this definition is the image of the good or compliant patient who obeys orders and the bad patient who does not comply or is uncooperative. This approach has been criticized as victim blaming with connotations of social control (Trostle 1988) and as neglecting both the patients' or users' perspectives and the factors that influence their management of illness and its treatment (Conrad 1985). Moreover, van der Geest (1988) suggested that compliance is not an appropriate concept in relation to drug use in non-Western societies where self-medication, combined with an increasing use of Western pharmaceutical products, is the main feature of pharmaceutical use. *Adherence* has been suggested as an alternative term, because this implies active acceptance rather than a passive response of the part on patients or users. More recently, *concordance* was proposed as part of a call for a more radical research agenda along with changes in doctor-patient relationships and an acknowledgment of the patient as a reasoned decision-maker (Royal Pharmaceutical Society of Great Britain 1997). On the basis of the literature on the use of childhood immunization services (Heggenhougen and Clements 1987), the terms *acceptability*, *use*, and *adherence* will be used here.

The research project described herein used a holistic approach, as recommended by Van der Geest (1988), because pharmaceutical use needs to be conceptualized (i.e., regarded within the wider context of health-seeking behavior as a whole as well as the factors that influence this, such as health beliefs and social structure). Many different models have been elaborated to conceptualize the health-seeking process (e.g., Kroeger 1983). The theoretical perspective used in this project was derived from medical anthropology, specifically a modified version of the model of the health-seeking process originally elaborated by Chrisman (1977). This model defines a series of steps that comprise the health-seeking process: symptom definition, illness-related changes in role behavior, lay consultation and referral, treatment actions, and adherence. With the use of this conceptual framework except for illness-related changes in role behavior, because this is irrelevant to young children, and on the basis of a review of the literature, symptom definition, lay consultation and referral, treatment actions, adherence, and folk dietetics and child feeding practices were identified as pertinent to this research.

Symptom Definition

Little is known about how childhood anemia is understood and interpreted by nonmedical personnel in different cultural contexts. Because folk explanatory models of health and illness form the conceptual basis on which much health-seeking behavior is predicated (Heggenhougen and Clements 1987), the health beliefs and perceptions of potential program participants in relation to child health and illness with specific reference to IDA need be explored. This includes whether there is recognition of the signs and symptoms of IDA in children, how they are interpreted, and what significance and etiology are attached to them. This process of illness recognition and labeling has implications for treatment: Are different types of treatment appropriate for different types of illness? This step in the health-seeking process comprises two components: recognition and labeling or diagnosis.

Lay Consultation and Referral

Decisions about whether to seek treatment and what kind of treatment are rarely made solely by the afflicted individual and usually involve a wider social group. This group may include the family or domestic unit and friends, relatives, and neighbors (van der Geest 1988). The Malawi study on maternal anemia found that not only household members and relatives but also neighbors were sometimes involved in health care decisions (Williams et al. 1996). Importantly, husbands controlled finances for the purchase of health care and food. Also, because young children cannot and do not make decisions regarding their own health, knowing who is involved in the decision-making process and who is responsible for child health and illness is important.

Treatment Actions

Many ethnographic studies have shown that the complexity of health-seeking behavior and the action taken regarding health care options may vary with different

types of illness. For example, among the Mende of Sierra Leone, different types of treatment were considered appropriate for different conditions and for different categories of people; pharmaceuticals were not thought to be appropriate for children, drugs with a bitter taste were thought to be good for expelling heat from the body, and injections were thought to be more powerful than tablets (Bledsoe and Goubaud 1988). In contrast, in a rural area of Brazil, self-medication was a common form of treatment and modern pharmaceuticals, including vitamin and mineral supplements, were routinely used to treat young children (Haak 1988).

Treatment actions may, therefore, cover a range of actions that may be selected from a range of alternatives. The options available will include both formal and informal health care providers (e.g., traditional healers) because medical pluralism is the norm in nearly all countries. How particular options are selected and used has been called the resort to care, and two common patterns have been identified. The first is simultaneous resort, in which all available health resources are used simultaneously. The second is sequential resort, in which different options are resorted to in a hierarchical fashion, with each option tried and perceived to fail before moving onto the next. The latter may commence with home care, then locally available medications and treatment regimens (e.g., from local healers and drug vendors), and then perhaps a clinic or hospital. It may also involve the rediagnosis of an illness if, for example, certain therapies fail to cure.

Adherence

Adherence to a particular treatment regimen may include several actions or behaviors, such as keeping appointments and taking or giving medications. In relation to IDA, the key behavior of interest is the sustained administration of the iron supplement and, depending on the service delivery mechanism, going to get the supplement.

Factors that influence adherence include concepts of efficacy and appropriate treatment, expectations of treatment (for iron supplements these may include color, taste, packaging, and dose), and expectations and management of side effects (e.g., how a darkening of stools is interpreted). In addition, because effective prophylactic iron supplementation requires the administration of supplements to an asymptomatic child (Palti et al. 1987), the concept of preventive vs. curative treatment actions becomes important.

Folk Dietetics and Child Feeding Practices

The term *folk dietetics* has been borrowed from Nichter (1985, 1986), who used it to draw together culturally defined food classifications, perceptions of food needs and physiology, and health behavior. As shown in his studies in south Asia, biomedical concepts regarding nutrition and health generally rarely converge with lay concepts, but it is important to be aware of these to design culturally appropriate nutrition education messages.

To date, few ethnographic studies have been carried out on child feeding but, as Pelto (1987) pointed out, it is a key topic with important implications for the design of interventions to improve the nutritional status of children. Pelto noted that besides looking at what is fed to children, there is a need to understand both how they are fed and the cultural expectations regarding appropriate growth and behavior of children. This issue cuts across the steps in the health-seeking process and is relevant because it will affect the acceptability and appropriate use of different formulations, namely tablets, liquids, and sprinkles.

Country Contexts

The research presented here was planned and carried out as a multicenter collaborative study conducted in Ghana, Nepal, Peru, and Sri Lanka. These countries were selected because they represented variation in several characteristics including the prevalence of anemia, socioeconomic characteristics, types of diets, cultural practices in relation to child care, access to health care, and use of public health care services. They also had in-country researchers engaged in studies related to micronutrient malnutrition.

The Ghana study represents a rural setting with a limited infrastructure. A road network exists and year-round access to villages is possible, but transport costs, routes, and travel time limit access to these services. Literacy rates are low and access to public health care services is poor although there is a thriving private health care sector.

Nepal represents a rural setting with a very poor public sector health infrastructure. Both child mortality and levels of undernutrition are very high. There is a national program for delivering vitamin A supplements that covers about 60% of the country, and intermittent pharmaceutical supplementation has been accepted.

Peru is highly urbanized and about two-thirds of the population live in urban areas, of which about one-third reside in Lima (Ministerio de Salud 1997). The study was carried out in a periurban area of Lima where literacy rates are high, many women work, and access to health care is good. In addition, the study area had previous exposure to food and nutrition programs, which made implementation of a supplementation program relatively easy.

Sri Lanka also represents a mainly rural setting but one with high literacy rates and good access to and high use of public sector health care. Child mortality rates are low but the prevalence of undernutrition is high. The government has expressed commitment to controlling anemia

and is one of the few countries in the world to have conducted a national anemia survey.

Research Methods

The approach and broad outline of which instruments to use were collectively decided at a workshop held at the London School of Hygiene and Tropical Medicine, 1–3 April 1998. Each country modified the research instruments developed to suit the local context, which allowed for individual variation while maintaining comparability across the country studies. This approach was similar to approaches used in other multicountry studies (Kuhnlein and Pelto 1997, Griffiths 1992, Scrimshaw 1992).

Sampling

Nonprobability purposive sampling was used to select the study sites and to choose key informants and respondents for the qualitative research. Rather than seeking a sample that was numerically representative, the objective was to explore health-seeking behaviors and any likely variation in these. This required the selection of groups relevant to the research questions and also representative of the likely range of possible observations in order to allow conceptual or theoretical generalizations to be made from the findings. Within each country, therefore, the procedures for selecting the sample were based on the likely range of sociodemographic variation among respondents, such as ethnicity and geographical location (e.g., rural or urban). These were specific to each country context and are described below. This type of sampling has also been called theoretical sampling and maximum variation sampling (Boulton and Fitzpatrick 1994, Mason 1996). Although probability sampling is sometimes used in qualitative research, nonprobability purposive sampling is more commonly used because it allows a more detailed exploration of social processes and similarities and differences in these within and between different social groups. Representative probability sampling is not always the best way to achieve this, in addition to generally requiring large and thus expensive and time-consuming sampling procedures.

The principal informers were women with young children. Emphasis was given to women with children below age 2 years because this age group is the most vulnerable to IDA and other micronutrient deficiencies. Other household members involved in child care or decision-making processes relevant to child health (e.g., husbands or partners, older family members) were also interviewed, except in Peru, where conversations with mothers suggested that grandmothers and other older family members did not play a critical role in the health-seeking processes of the household and often did not even live in Lima.

Data Collection Methods

Different qualitative techniques were used to collect the data, which allowed for methodologic triangulation or crossvalidation of methods to increase validity and reliability. The interview guides were translated into the local language, pretested in a setting outside the study area, modified on the basis of pretest findings, and translated back into English before being used for training. The methods used to collect the information were in-depth interviews, focus group discussions, and structured questionnaires.

In-depth interviews. In-depth interviews were the principal research method used. This format is more flexible and open-ended than a structured interview and allows respondents to raise unanticipated topics and issues that can then be explored. Interviews were carried out using a written checklist or interview guide, agreed on at the planning workshop, of topics to be covered in the interviews (see Appendix 1) and by the in-country research team. Probes were used to draw out respondents and for clarification to ensure that interviewers had fully understood responses and were not imposing their own words or ideas on the interview. The in-depth interviews were conducted with a range of respondents in each country, with the principal target group being mothers with young children. The details of specific respondent types and sampling procedures are described in each country chapter.

In all of the countries except Nepal, some key informant interviews (see below) using the topic guides were performed first. The responses were used to refine the interview guides used for the in-depth interviews and mostly involved identification of local words and terms to aid the interview. In Nepal the topic guide was tested separately and modified on the basis of this test. Changes made to the interview guides for each country are shown in Appendix 1.

Because questions were asked about standard topics, the analysis and comparison of findings were facilitated. Interviews were conducted with a range of respondents, including mothers and other household members (Table 1.1). The study protocol included a maximum of 10 in-depth interviews in each stratum of the study population.

Interviews were recorded on tape in Peru and Sri Lanka and detailed notes were taken in all countries. At the end of each day, the interviews were transcribed by the persons who conducted the interview. Each interview lasted around 60 minutes in Ghana and Sri Lanka, 90 minutes in Nepal, and 45–90 minutes in Peru. In some instances in Sri Lanka, an interviewee had to be visited again to complete the interview.

Focus group discussions. Focus group discussions

Table 1.1. Sample details for multicenter qualitative research on iron deficiency anemia

	Communities represented	Sample for in-depth interviews	Sample for focus group discussions	Key informants
Ghana	Urban Mo, Fanyinama Line, and Nwoase ethnic groups in Kintampo Bono rural ethnic group in Krabonso Rural northern migrants in Portor Mo rural ethic group in Asantekwar	10 mothers with children aged 6–24 mo/group (n=60)	2 elderly men (heads of households aged 45–85 year)/group 2 elderly women (45–90 years)/group 2 young mothers (15–35 years) with a child aged <2 years /group	2 district assembly people 2 prominent women 2 queen mothers 2 grand mothers 2 traditional healers 2 traditional birth attendants 2 household heads 2 teachers 2 chemical sellers 2 community health nurses 1 public health nurse 1 medical officer
Nepal	*Sitapur* Ilaka Nepali speakers Maithili speakers Tharu group *Kanchanour* Ilaka Nepali speakers Maithili speakers Tharu group	10 women of reproductive age having more than 1 child aged <5 years/group/site (n=60)	6-8 respondents per discussion; 3 discussions /ethnic group/ *Ilaka*	4 auxiliary health worker 3 auxiliary nurse midwife 4 maternal-child health worker 4 village health worker 4 family community health volunteer 4 traditional birth attendant Equally divided between the *Ilakas*
Peru	A low zone, settled urban area with basic amenities A high zone, characterized by squatter settlements	Mothers with children aged 6–24 months: 11 from low zone 10 from high zone (n=21) Selection criteria included parity, age of the youngest child, and educational level 3 husbands from both zones (2 from the low and 1 from the high)	Mothers of children aged <2 years in the low zone Mothers of children aged <2 years in the high zone 6-8 respondents per discussion.	2 nurses in charge of the Ministry of Health growth and development program serving both zones 2 local pediatricians at the local health service, 1 in a health post and one in the hospital 1 woman in charge of a community kitchen[a] in the low zone, an experienced health promoter 2 health promoters from other sectors; 1 from the low and 1 from the high zone 1 woman in charge of a community child day-care center in the low zone
Sri Lanka	Rural dry zone with endemic malaria Rural wet zone with high helminthic rates Urban slums Estate	20 mothers with children aged <2 years /site (n=83) 6–8 male household heads/site (n=27) 5–6 older women/site (n=23)	4 with 8–10 women/ site 1 with men at each site and 8–11 men/group	16 district medical officers of health from the non-estate sites. 8 estate medical assistants 23 public health midwives 5 pharmacists 2 practitioners of indigenous medicine

[a]The community kitchens are organizations where women have organized themselves and grouped together, combining resources to provide a main meal of the day for their families at less cost. Many of the community kitchens receive donated food and subsidies from the govemement and they tend to serve poorer sections of the periurban population.

were conducted in each setting selected for study. They included mothers with children below age 2 years and others in the household involved in decision-making processes related to child health (Table 1.1). The study protocol stipulated more than one focus group discussion for each stratum of the study population.

In Peru, health promoters from each zone were asked to invite mothers from their neighborhoods who had not had in-depth interviews to participate in a focus group discussions.

In all countries the purpose of these group discussions was to explore issues requiring further clarification as a result of in-depth and key informant interviews and also to compare findings from the in-depth interviews for the purpose of crossvalidation.

Focus group discussions were carried out by paired teams, with one person responsible for conducting the discussion and the other for taking notes. The discussions were recorded in all countries and the interviews were transcribed from the tapes at the end of each day and supplemented with the notes. The focus group discussions lasted on average 1 hour in Ghana, about 2 hours in Nepal and Peru, and more than 2 hours in Sri Lanka, where they were conducted with a tea break.

Key informant interviews. Key informants were purposively selected in each setting and included individuals with special knowledge about issues related to child health, anemia, and health-seeking behaviors at the sites. Key informants were drawn from a range of people, both professional and lay, including formal and informal leaders, men and women, health care providers, pharmacists and shopkeepers who sell supplements and other medication, traditional birth attendants, and other traditional healers (Table 1.1). The interview guides used in the in-depth interviews were also used in the key informant interviews. Nevertheless, because the interviews were specific to the areas of the key informant's expertise, not all interviews covered all the topics areas developed for the in-depth interviews.

Structured questionnaires. In Peru a sample survey using a structured questionnaire was also conducted to complement the information obtained from the qualitative research methods. The purpose of the quantitative data was to check the consistency between the findings from the in-depth interviews and those from the larger population in the study area and therefore determine whether generalizations could be made from the in-depth interviews. The questionnaire used was developed from the guides used for the in-depth interviews.

Field Operations

Recruitment and training of staff. In all countries, field teams were indigenous to the study area. In Sri Lanka and Ghana, field teams included two graduates in sociology and a health care provider, most with experience in qualitative data collection. In Peru a team of sociologists and anthropologists was responsible for data collection. In Nepal research assistants with experience in qualitative methods of data collection were used. Except in Peru the project coordinator trained all researchers in data collection procedures and analysis on site. Training included a general introduction to the principles of qualitative research and techniques for qualitative interviews, practical training in specific data collection instruments (interviewing and focus groups) to reduce interviewer bias, data recording, and analysis. In Sri Lanka further interviewer training was done in country by project staff with experience of qualitative research methods.

Quality assurance. Quality assurance was maintained by regular review meetings of the research team at all sites. Independent verification of the findings was done by the principal investigators, who conducted separate interviews at each site, where language permitted.

All information was recorded in the language in which the interviews and discussions were conducted. In Sri Lanka two languages were used; Sinhala was the major language in Anuradhapura (dry zone agricultural area), Kalutara (wet zone rural area), and the urban slums and Tamil was used in the tea estates.

Intercountry Commonalities and Differences

Details of differences in the research methods used in each of the country studies are described in the specific study chapters. Overall, there was good agreement with the research methods decided on at the planning workshop. Nevertheless, there were inevitably some differences in implementation dictated by the different contexts that need to be highlighted for discussing the results.

Site Selection

The study was carried out in six sites in Ghana, four in Sri Lanka, and two each in Peru and Nepal. Sites were selected to capture differences in ethnic composition or socioeconomic characteristics and access to health care.

Ethnic differences were captured in the selection of the sites in Ghana and Sri Lanka and in the selection of individuals for interviews in Nepal. Ethnicity was not considered an important determinant in site selection in Peru because ethnic diversity is less important than differences in socioeconomic status.

Sites in Ghana and to a certain extent in Sri Lanka had contrasting urban-rural characteristics. Consequently, they also differed in their access to health care. These differences did not exist between the two sites in Peru, which were periurban and next to each other with relatively good access to modern health care, or in Nepal, where they were uniformly rural.

The marked within-study site differences allowed for the exploration of possible differences in perceptions of issues related to IDA and its control.

Sources of Information

Mothers with young children. In all the countries this was the main group studied, although the selection criteria varied (Table 1.1). Mothers with infants and young

children ages 6–24 months were included in Ghana and Peru, ages up to 24 months were included in Sri Lanka, and ages up to 59 months were included in Nepal. In Nepal an important proviso was that the mother should have more than one child below age 5 years to ensure that she had adequate experience in child care. When a mother has only one child, other family members, such as grandparents and especially senior women, influence all decisions regarding the health of both mother and child. Mothers with more than one child have thus acquired more knowledge and personal experience in child care. Mothers were interviewed individually for the in-depth interviews and participated in the focus group discussions. In Peru they were also the respondents in the sample survey.

Other respondents. Other respondents were included in all country studies except Nepal (Table 1.1). In Ghana, focus group discussions with male heads of households and with elderly female household members (grandmothers, aunts, in-laws) were also carried out. In Sri Lanka both in-depth interviews and focus group discussions were held with male heads of households (fathers of the children), and elderly household members were interviewed. In Sri Lanka and Peru, male heads of households were also selected for in-depth interviews. Responses from these groups were compared with those from the mothers.

Key informants. In all the countries except Peru, key informant interviews included both trained health workers and traditional practitioners in their communities (Table 1.1). In Ghana, informants included general medical officers (whose practice is predominantly pediatric), community health care providers, and community leaders. In Sri Lanka, health care providers were the informants. In Peru pediatric specialists, nurses, and other trained child careers such as day care center attendants were the key informants. In Nepal the trained health workers interviewed were all auxiliary health staff.

Additional Data Collection Activities

The study in Peru included a quantitative survey and a small-scale pediatric iron supplement trial. The survey used a close-ended questionnaire and was conducted on a random sample of mothers equally distributed in the two study sites. The quantitative survey was carried out toward the end of the study and the results were analyzed for consistency against the information collected in the qualitative interviews. Although a validation survey was planned as part of the Ghana study, this was dropped because of time constraints.

The home-based trial in Peru was designed to test the use of iron supplements by mothers who had no experience of supplement use for their children. It was carried out over a short period on a very small sample of mothers as a preliminary exploration of their experiences with the use of supplements.

Data Analysis

The general principles of grounded analysis were followed as originally elaborated by Glaser and Strauss (1967). That is, the analysis and interpretation of data should be grounded in and arise from the data themselves and not be imposed on the data, because the purpose of this research was to understand and document the informants' own beliefs and attitudes—the insider or "emic" perspective.

The data collected at each interview and focus group were summarized in relation to the major topic areas covered. Once data collection was completed, all the responses were grouped into coding categories developed inductively by the entire study team in each country to reduce the effect of personal bias in the interpretation of findings. This process was to capture the range of views, attitudes, and behaviors expressed during the discussion. Thus, the coding categories reflected the natural groupings that responses fell into rather than categories predefined by the researchers or reflecting their interests and biases.

To compare and analyze the pattern of responses in the different study sites in each country and across the different countries, the grouped responses were summarized in tables by using a simple weighting system to reflect the frequency that particular responses were cited. Slightly different weighting categories were used in each country to capture the scatter of responses in each study. Responses not related to the topic were removed.

Summarizing responses in this way (shown in each study chapter) allowed the identification of common patterns of views on particular topics or differences of opinion both among the different study sites in each country study and among the different countries. They also allowed an assessment of whether these views represented a consensus of opinion; because the findings were to be used to make generalizations regarding community perceptions and attitudes, establishing whether particular views or beliefs were widely held or idiosyncratic was important. As Seale and Silverman (1997) comment, such quasi-statistics are one strategy to enhance the rigor and validity of qualitative research findings, especially if they are being used to support generalizations, and have been used in similar studies (e.g., Nichter 1997). The findings from the in-depth interviews were also compared in this way with the findings from the focus groups. All the analyses were conducted manually.

In Peru the quantitative household survey data were entered in Foxpro and checked for consistency. Data were analyzed by using SPSS version 7.5 for Windows.

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2: FINDINGS OF THE GHANA COUNTRY STUDY

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Background

Ghana was selected as a site in Africa that reflects a community with a high prevalence of childhood anemia. Malaria is endemic and access to health services is limited.

Prevalence of Anemia in Children

A national anemia survey carried out in 1995 showed that the prevalence of anemia was 83.5% in preschool children. Anemia resulting from infection (malaria) was equally as important as iron deficiency anaemia in the etiology of anemia in preschool children (Ghana Ministry of Health, unpublished report, 1998). The expanded program of immunization and studies in the Kintampo District found that 83% of 716 infants and young children were moderately anemic (hemoglobin [Hb] <110 g/L), (Table 2.1) (P. Arthur, B. Kirkwood, S. Cousens, et al., unpublished report, 1997). A study of 15,450 children under age 15 years who had been referred to the Korle-Bu Teaching Hospital, Accra, estimated that the prevalence of severe anemia (Hb <50 g/L) was 71% (Commey and Dekyem 1995). Although hospital data do not reflect population values, this prevalence value is a useful indicator of the extent of the problem.

Data from the Kintampo District Hospital for 1996 and 1997 showed that anemia was one of the top 10 causes of outpatient department attendance (District Health Management Team 1997, 1998), which reflects the general pattern in most rural areas in Ghana. In the Kassena Nankana District of northern Ghana, anemia was reported to account for 18% of hospital deaths (Koram et al. 1997).

Table 2.1. Prevalence and mean and standard deviation (SD) hemoglobin (Hb) values for infants of various ages in Kintambo District

Age	n	%	Hb Mean ± SD (g/L)[a]
6 weeks	203	70.9	101 ± 17
6 months	226	89.4	91 ± 16
9 months	166	89.8	89 ± 16
1 year	121	82.6	90 ± 20
Overall	716	83.1	93 ± 18

[a] Hb cutoff for anemia = 110 g/L.
Source: P. Arthur, B. Kirkwood, S. Cousens, et al., unpublished report, 1997.

Anemia in children is attributable mainly to iron deficiency. This is the result of both high physiologic requirements of the rapidly growing infant and young child and pathologic blood loss caused by parasites. Iron status is also influenced by iron intake and, more importantly, by the bioavailability of dietary iron (Commey 1995, Fleming 1984, Ebrahim 1981).

Not all anemia is due to iron deficiency, however. Results of a study conducted in the Kassena Nankana District of northern Ghana showed that the prevalence of anemia at the end of the high malaria transmission season was 23% (prevalence of parasitemia 71%) compared with 11% at the end of the low transmission season (prevalence of parasitemia 54%). Although the contributions of iron and folate deficiencies were not determined, these results suggest that the effect of malaria transmission on the seasonal variation in anemia may be more important than dietary factors (Koram et al. 1997).

Ghanaian mothers are aware of a range of symptoms of anemia, and it is not uncommon for mothers in affluent households to purchase and administer multivitamin supplements and blood tonics to young children. Although strong cultural beliefs surround the concept of blood and health, other micronutrient deficiencies are less well recognized. For example, studies have shown a high prevalence of subclinical vitamin A deficiency. However, xerophthalmia is rare and vitamin A deficiency is not known in the local disease taxonomy.

Anemia Control Policies and Programs

The Ministry of Health does not have a policy for providing iron supplements to children although such a policy exists for pregnant women. Nevertheless, there is a trend toward preventing micronutrient deficiencies, as exemplified by the Ministry of Health's current vitamin A supplementation program in the northern sector of the country comprising northern, upper west, and upper east regions. Supplementation was instituted in the Kintampo District

after subclinical vitamin A deficiency was detected in children younger than age 5 years and, following a review of the results from a national prevalence survey, the decision was recently made to extend distribution to the whole country.

Because of the results from the national anemia survey, the Ministry of Health is discussing a preventive iron supplementation program for children. Clinicians and public health professionals have been urging the government to begin such a program, and the expectation is that the program may start soon.

Review of Relevant Ethnographic and Qualitative Studies

Few ethnographic studies related to anemia have been carried out in Ghana. In an anemia-related study conducted with 227 adolescent girls in two rural communities in southern Ghana, blood was linked to the soul, spirit, and life of living humans and animals (Agyepong et al. 1997). Offspring were said to be the result of mixed blood from both parents. Although the source of blood was attributed to God, food—notably fish, meat, milk and tea, dark green vegetables, palm nut soup and oil, beans, garden eggs, and *agushie* (melon seeds)—was recognized as contributing to the production of blood. Herbal preparations also were used to enhance blood production. Diseases related to blood were of two types: too much blood (hypertension) and too little or less blood ("blood level has fallen"). The former was caused by eating too much good or rich food and the latter resulted from exposure to excessive heat and poor nutrition, among other things. Heat was thought to suck the blood from the body. Blood-related diseases were prevented by eating an adequate diet and taking prophylactic drugs. Because food plays an important role in blood formation, folklore related to feeding practices is relevant to understanding both how to prevent iron deficiency anemia and how to deliver iron supplements to young children.

A 1995 dietary study in the Kintampo District revealed that mothers introduced complementary foods to infants at various ages depending on the child's interest in being fed food other than breast milk. The first complementary food included *koko* (maize porridge), soft *abetie* (maize or dried cassava flour stirred in boiling water), tea with bread, and rice water with bread. Although mothers stated that health workers had advised them about how to add groundnut, beans, and anchovies to maize and they had prepared these porridges for infants and young children, most did not follow the advice. Being able to buy the ingredients or food (i.e., affordability) was an important criterion for children being fed food perceived to be good for them (Hudelson et al. 2000). Foods thought to be bad for children were those that cannot be tolerated by the child's stomach (e.g., *konkonte* [cassava flour, steamed into a thick pap] and *fufu* [made from starchy staples, usually tubers such as yam, cassava, and cocoyam or plantain, boiled and pounded into a soft ball]), although there was a consensus that red palm oil, eggs, *kontomire* (cocoyam leaf), and tomatoes are good for children. Most informants stated that children were fed three times each day and given snacks. Food was cooked in the morning and kept for consumption later in the day. Schoolchildren in particular were also given money to purchase food from vendors.

Study Setting

This study was carried out in the Kintampo District in the Brong Ahafo Region of Ghana, a rural district containing an estimated 165,000 people living in about 174 dispersed villages. The Bono and the Mo are the two indigenous ethnic groups. Many migrant ethnic groups from the northern part of the country, some of which have become indigenous, also reside in the district. Consequently, most villages are multiethnic, with one group predominating (usually Bono or Mo although sometimes a migrant group) over several minority groupings. Distinct parts of a village are inhabited by different ethnic groups.

The public health service infrastructure in the Kintampo District is limited. There is a health center (two doctors, 40 beds) that was recently upgraded to a district hospital and four health posts that are manned by medical assistants and nurses. Curative services are delivered from these fixed facilities, and preventive and promotive health services are delivered to surroundings villages by monthly mobile outreach clinics. The use of health facilities in neighboring districts is high because of easier access or perceived better quality care in those facilities. Alternative health care providers include chemists, informal drug sales agents, and traditional healers and are frequently used. In a recent study of health care–seeking behavior in the district, 52% of the mothers who sought treatment for ill children outside the home consulted a drug seller, with 29% going to traditional healers and the rest to a health center or hospital (Ghana Health Seeking Behaviour Project, unpublished report).

Since 1994 the district has been the field site for the Kintampo Health Research Centre and has been the subject of both anthropologic and epidemiologic research studies. The center has a well-developed study area and has established credibility and rapport with the local political and traditional administrators and with the district health services. It maintains morbidity and demographic surveillance on the child population in the area through a network of village-based field workers supplemented by a health management information system in the hospitals serving the area. The Kintampo Health Research Centre has a computer center with a high-volume on-site data

management system, adequate office and transport facilities for field work, and a core of experienced field and administrative staff for managing research projects.

Children below age 5 years comprise about 20% of the district population. Infant mortality is estimated to be 90 per 1000 live births and child mortality is estimated to be 35 per 1000 live births. Child morbidity is high: data from the ongoing morbidity surveillance system show average monthly and daily prevalence rates for diarrhea in infants of 23% and 10%, respectively. Acute respiratory infections, acute diarrhea, and malaria account for more than 90% of the childhood morbidity and mortality burden.

Polygamy is common. Family units frequently comprise the husband (father) as head of household and several subhousehold units made up of a wife and her children, all of whom live in the same compound. The processes for making decisions about health care are better understood for curative care than for preventive and promotive care. Although each mother is responsible for the care of her own children and, as such, for the management of the sick child, the main decisions about whether to use health care are made by or on the advice of the most senior woman in the compound, who is often the eldest wife or the mother, aunt, or other older female relative of the head of the household. These decisions are influenced by the head of household only when constrained by the cost of the care recommended. Decisions on resort to care are also influenced by a variety of factors, such as the recognition of symptoms of illnesses, perceptions of danger signs and severity of illness, and labels placed on illnesses. The above are not only determined by the mother's own knowledge and beliefs but are also influenced to a large extent by those of her peers and, for young mothers, those of other senior women in the household (senior wife, mother-in-law, etc.). Other factors influencing resort to care include distance to health facilities, the cost of care (both direct costs and social costs), and perceived quality of the available care, such as the available supplies and diagnostics, facility opening times, and health staff attitudes.

Research Methods

The research methods described in Chapter 1 were followed. The initial preparation of the communities for the in-depth interviews and the focus group discussions was done through the chiefs and assembly persons for the areas selected. Key informants comprised both professional and lay people representing formal and informal leaders in the selected communities. On the basis of the analysis of their responses, the interview guides developed at the planning workshop in London were modified for use for the in-depth interviews (see Appendix 1).

Participating mothers with children aged 6–24 months were purposively selected with the help of community leaders. This was because it was not possible to enter communities and start looking for "married" women to talk to without informing the community leaders. The involvement of the community leaders also ensures the participation of community members in the research process and therefore ownership and use of findings. Once identified, mothers were informed about the study and gave verbal informed consent to participate, and an appointment was made for conducting the interviews and discussions at their convenience. The approval to conduct of the study was sought from the Kintampo District Assembly.

Data were analyzed by ethnicity and locality (urban or rural).

Results

This section describes the findings from the in-depth interviews, which are summarized by location (urban or rural) and ethnic group in Tables 2.2–2.10. Where relevant, issues raised by the key informants are included; otherwise, their responses conformed with those from the in-depth interviews and focus groups.

Perceptions of Health

Children were considered healthy when they were active or playful and ate well (Table 2.2). Other indicators of a healthy child were no unusual crying and no fever. Participants in a focus group discussion explained that a healthy child can be detected by looking at the eyelid and the sole of the feet. Healthy children were brisk or vigorous in movement and even in breast-feeding, and their faces looked bright rather than dull or gloomy. Other signs of a healthy child related to sleep and to toilet. Healthy children wake up in the morning, do not stay in bed for an unusually long time, and pass their usual morning stools. Some participants stated that the absence of vomiting and diarrhea also indicated a healthy child. Eating good food was important for promoting good health. Urban participants tended to say poor personal hygiene caused ill health, but there was no clear trend for causation among rural respondents.

Among the key informants, chemists mentioned mosquito bites and worm infestations as some of the causes of childhood ill health, suggesting that chemists had a better insight than others into the germ theory of disease causation. One chemist mentioned that witchcraft caused disease. Health workers thought that mothers did not have an adequate understanding of the causes of ill health in children; they said mothers attributed many childhood illnesses to superstition. Because these opinions are contradicted by the statements of the respondents themselves,

Table 2.2. Concept of health[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Indicator for healthy child							
Active and playful	+++	+++	+++	+++	+++	+++	50
Eating well	+++	++	+	+++	+++	+++	40
No fever		++	++				9
No crying		+	+		++		11
Sleeping well					++		4
Not breathing fast			+				3
Gaining weight				+		+	6
Strong				+			1
No constipation		+					1
Indicator for not healthy							
Fever	+++	++	+++	++	+++	+	37
Inactive	+++	+++	++	++		+	30
Refusal to eat	+++	+	+	++	+++	++	32
Unusual crying	++	++	+		+++	++	25
Weight loss						+	2
Yellow eyes		+	+				2
Constipation		+					1
Vomiting			+				1
Health promotion							
Eating good food	+++	+++	+++	+++	+++	+++	53
Personal hygiene	+++	+	++		+++	+	27
Giving medicine	+	++	++		++	+	18
Weighing				+			2
No fever				+			2
Breast-feeding				+			1
Prevent mosquito bites			+				1
Keeping warm		+					1
Causes of ill health							
Poor personal hygiene/dirt	+			++	++	+++	20
Poor sanitation				+			2
Exposure to cold weather	+		++	+		+	8
Mosquito bite			+			+	4
Dirt in stomach		+					2
Refusal to eat		++	+				5
Pepper						+	3
Exposure to hot sun		+	+				3
Bad food				+			4
Sore anus		+					1
Don't know	++		+	+	++		15

[a] n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

it is likely that they are the product of the health workers own misconceptions and negative assumptions about women's beliefs.

Association between Food and Health

All participants said an association exists between food and health, and most stated that food gives strength to the child (Table 2.3). About one-third said that food makes blood and helps with growth. Participants in urban focus group discussion also said that food contributed to protecting against infection. A few participants said that giving children food makes them obey their parents, who were then able to control their movements and behavior.

Specific foods were not identified as good or important for providing the specific functions stated above. Indeed, different long lists of food were drawn up by the different participants. Both urban and rural participants emphasized foods such as cereals and legumes (beans and groundnuts, which are staple foods). Fish and green leafy vegetables were also indicated by about one-half of respondents. In addition, during the focus group discussions, the rural participants also emphasized red palm oil and the urban participants emphasized breast-feeding. Others foods mentioned were porridge, weanimix (a ground and roasted mixture of maize, groundnuts, and fish or beans), *tuwozaafi* (millet or maize flour, steamed into a thick pap) or *abetie*, and fish. The concept of specific nutrients was unknown and no particular substance in

Table 2.3. Association between food and health[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Association exists							
Yes	+++	+++	+++	+++	+++	+++	60
How							
Gives strength or energy	+++	++	+++	+++	+++	+++	53
Makes blood	++	++	+	+++		+	22
Helps children to grow (height/weight)		+	+	+	++	++	15
Provides health		+			++		5
Gives satisfaction						+	1
Gives happiness						+	1
Good foods							
Cereals	++	++	+++	++	++	+++	43
Legumes		++	+++	+++	++	+++	40
Staples	+++	+	+	++	++	++	31
Fish		++	+++	++	++	+	27
Green leafy vegetables			+++			+++	25
Red palm oil			++	+		+++	17
Eggs		+		+		+	6
Meat			+	+			3
Bad foods							
Raw staples							
Fufu	++	++	+++	++	+		25
Abetie	++	+	+	+			12
Rice		+		+		+	4
Gari (cassava)				+			1
Raw beans		+	+	++		+	8
Mango						+	1
Cake						+	1
Pepper						+	1
Toffee						+	1
Don't know		+	+		+++		10
Illness caused by lack of specific foods							
Shortage of blood	+				+	+	6
Kwashiork	+			++	+		8
No strength						+	1
Poor bone formation				+			1
Failure to thrive						+	1
Fever						+	1
Don't know	++	+++	+++	++	++	+++	44

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

the above foods was identified as a basis for their being good.

The rural elderly men and women said that no food was bad for children except in certain situations where the child's stomach cannot tolerate some foods. Urban participants and the young rural women's groups, however, stated that *fufu,* especially if made from cassava, was bad for children. *Fufu* and cassava were said to be bad because they are too starchy and heavy for children. Participants emphasized that when a child starts eating either of these dishes at an early age (3–10 months), the onset of walking is delayed and the child's stomach becomes big. Also, children are not able to digest the local red stripped rice, which was said to create sores in the stomach. Other foods considered bad were *abetie* (because it contains cassava), roasted yam or cocoyam (because it is often eaten without stew), and leftover cold food that may have gone bad.

Most mothers could not indicate a specific illness that results from a lack of specific food. Nonetheless, a few did so and mentioned that a childhood illness similar to shortage of blood was attributable to not eating *kontomire,* anchovies, and beans; kwashiorkor that resulted from children not being breast-fed; and the absence of groundnuts, beans, *agushie,* and fish in the diet.

Kwashiorkor was known by urban participants to be a disease or illness resulting from not eating fish, eggs, anchovies, beans, *kontomire,* palm oil, and *dawadawa*

Table 2.4. Association between food and blood

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Association exists							
Yes	+++	+++	+++	+++	+++	+++	60
How							
Makes child healthy	+	++	+++			+	18
Gives strength	+++	+	+			++	17
Gives blood	+++	++		+++	+++	+++	41
Good foods for blood							
Kontomire	+++	+++	+++	+++	++	+++	49
Red palm oil	++	++	+++	++	+++	+	33
Egg	++	++	+	++	++	++	28
Agushie	+	+	+	++	++	++	20
Anchovies	+	+	++		+++	+	19
Beans	+	++	++		++	+	17
Ayoyo	++	++			++		15
Groundnut soup	+	+	+				5
Reasons							
Improves blood	+++	+++	+++	+++	+++	++	51
Produces blood quickly	+						2
Provides strength/energy				+		++	6
Taught by health workers	+						3
Specific nutrient in food good for blood							0
Bad foods for blood							
Raw staples		+	+	++	++	+	14
Gari		+	+	+			6
Fufu		+	+	++			7
Abeti		++		+		+	5
Rice			+	+			4
Banku		+				+	2
Too much salt	+						2
Abele walls (ice cream)						+	1
Pepper						+	1
Hausa beer						+	1
Yellow coconut						+	1
Don't know	+++		++		++		19
Reasons							
Doesn't promote blood		+	+	+	++	++	14
Leads to diarrhea				+		+	6
Gain nothing					++		5
Drains blood		+	+				5
Stops growth		+					2
Makes child sick				+			2
Don't know	+++	++	++	+		+	26

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

(African locust beans). This had been learned from health promotional activities delivered by the community health nurses and other health workers. In addition, some participants stated that not eating the above foods could result in a shortage of blood and low intelligence, but they did not know what nutrient deficiencies or substances in the food caused these conditions. One group of elderly women in the urban area thought that kwashiorkor was caused by early sexual relations after delivery, early pregnancy, and early cessation of breast-feeding. They argued that this childhood problem did not exist in their days, when they abstained from sex after delivery until their children could walk.

Association between Food and Blood

There was unanimous agreement that food makes or increases blood and has other general functions, such as providing energy (Table 2.4). Both the urban and rural participants specified that *kontomire* and red palm oil were good for blood. In addition, a significant number of urban

participants—more so than rural participants—listed egg and *agushie*.

Some participants, mainly urban, said that some foods were bad for blood. These were, notably, raw staples. Others were raw *gari* (grated cassava, fermented, dried, and roasted into small grains and then reconstituted into a meal by mixing with hot water), *fufu*, and *abetie* without soup. In the focus group discussions all the rural groups said that some foods were bad for blood. They emphasized raw *gari*, slices of raw yam (e.g., water yam not in a stew), *fufu*, and *abetie* without soup. In contrast, the urban focus group discussion participants were divided on this issue, with one-half listing cassava (*konkonte*), roasted yam, cocoyam (i.e., foods not in a stew), and *fufu* as bad for blood. The reason given was that these foods would not provide blood if they were not in a good soup or stew. The reason given for the different opinions was that some children prefer to eat *abetie* or *fufu* without the accompanying soup or stew, which amounts to eating mainly carbohydrates. Also, roasted yam or cocoyam are often eaten raw without any stew. Some children enjoy eating *fufu* while it is being pounded, before it is added to soup.

Association between Blood and Health

The consensus among all the participants was that blood relates to health through its ability to give strength and make a child healthy (Table 2.5). The main problem associated with blood was a shortage of blood (*mogya so ate*), primarily caused by fever, malaria, or worms but also by issues related to food and working hard in the hot sun, because these consume or use up blood. A few elderly men said spoiled or dirty blood was a related problem. In this condition, the blood appears thick and black. Some urban participants also mentioned that blood could be watery. Such blood is too light or too thin to be able to carry out its normal function. Spoiled or dirty blood was likened to the traditional belief of having dirt in the stomach, for which enemas are administered during diarrhea to clear the dirt. Drinking and bathing in a herbal preparation to purify the blood appears to have a similar function.

As a corollary to the causes of blood shortage, respondents said blood can be improved through diet and, to a lesser extent, medicine. Many had indeed used food to improve their child's health.

Signs and Symptoms of Anemia

Key informants identified the local phrases given to problems related to blood as *mogya so ate* and *mogya awie*, meaning shortage of blood or reduced blood. These conditions were recognized by one-half of the participants to be common in the communities, and children ages 1–3 years were identified as the group most affected (Table 2.6). The spontaneously stated signs and symptoms of a shortage of blood, as stated by mothers in the in-depth interviews and focus group discussions, were primarily pale eyelids and pale palms and, after probing, loss of appetite, pale nails, and inactivity. Fever, which was stated to cause a shortage of blood by participants in the focus group discussions, was also listed as a symptom of anemia. In the in-depth interviews, failure to thrive, puffy face, and pica were not known as signs or symptoms of anemia in children by many mothers.

Health workers identified the signs and symptoms of a shortage of blood as poor pallor of the palms, feet, and eyes (conjunctiva); puffy face; and edema of the feet.

Treatment and Prevention of Anemia

All participants said that a proper diagnosis was made when children were sent to the hospital because they had a shortage of blood. Treatment included the provision of food and drugs (Table 2.7). Some children were treated with herbs or given a blood transfusion. One mother was aggrieved because her child died during the process of blood transfusion. Many respondents did not know about supplements and injections as methods for treatment of shortage of blood.

The existence of a shortage of blood was reportedly lower in urban than rural areas. From the descriptions given, children ages 1–3 years with kwashiorkor were identified as being susceptible to a shortage of blood.

The drugs used for treating a shortage of blood included multivitamin syrup, vitamin B complex syrup, chloroquine syrup, and paracetamol syrup. Some participants also mentioned blood tonics but could not specify the brand names. The foods used to treat a shortage of blood were *kontomire*, anchovies, eggs, *kwawu nsusua*, and palm oil. The use of traditional herbs for treatment of shortage of blood featured marginally and but more so with rural mothers. Herbal treatments included dried cocoa leaves, mahogany leaves, *nyame dua* (Nim tree), and *nkodaa broodie num* (five children's plantain), which were said to improve appetite and restore blood level very quickly.

Shortage of blood was thought to be preventable by almost all the respondents and the method they would used for prevention were listed as food (e.g., *kontomire*, red palm oil, and fish) and blood tonics or medicines. Other respondents mentioned *ayoyo* and egg. Rural mothers were more specific than urban mothers. Again, most said they had tried their methods and did not have any problems.

Mothers' use of medicines and tonics for their children was explored. Many respondents spontaneously said they give medicines and tonics to their children. The tonics given for blood shortages and loss of appetite were usually purchased from the hospital or the chemical seller.

Various types of medicine were given for different

Table 2.5. Association between blood and health[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Association exists							
Yes	+++	+++	+++	+++	+++	+++	60
How							
Provides strength	+++	+	+	++	+++	+++	33
Makes children healthy	+++	++	+++	+	++	+	32
Provides blood		++				+	6
Protection				+			2
Gives life				+			2
Leads to growth		+					1
What can go wrong with child's blood							
Shortage of blood	+++	+++	+++	+++	+++	+++	59
Dirty blood		+					1
Spoilt blood		+					1
Causes of shortage of blood							
Fever	++	+	+++	+	+++		27
Refusal to eat		+	+				4
Worms	++				++		9
Bad food			+			+	2
Improper feeding						+	1
Improperly cooked food				+	+		3
Tiredness						+	1
Hot sun		+				+	2
Malaria				+			3
Jaundice			+	+			3
Convulsion		+					1
Too much salt		+					1
Vomiting		+					1
Don't know	+					++	6
Improving child's blood							
Give foods							
Kontomire		+++	+++	++		+++	29
Eggs		++	+	+		++	14
Food	+++				+++		17
Fish		+	+++	++		++	19
Red palm oil		++	+++	+		+	16
Breast milk						+	1
Groundnut soup						+	1
Beans						+	1
Koko (porridge)						+	1
Give medicine	+++	+			+	+	13
Blood tonic (Madam Catherine)		+					1
Blood transfusion				+			1
Don't know	+						3
Measures tried							
Yes	+++	+++	+++	+++	+++	+++	49
No		+	+	+	+	+	11
What tried							
Food	++	+++	+++	++	+++	+++	42
Fish			++	+			7
Soup		+	+++				9
Eggs		++	+	+			8
Beans		++	++	+			9
Milo				+			1
Blood tonics	++	+					7
Drugs		+					1
Hospital				++			4

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

Table 2.6. Signs and symptoms of shortage of blood[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Common in community							
Yes	+++	+++	++	+	+++		30
No		+	++	+++	+	+++	27
Don't know			+		+		3
Age group affected							
Under 6 months							0
6–11 months	+++		+				5
1–3 years	++	++	+	+	++		20
4–5 years	+	+++			+++		5
Spontaneous							
Pale eyelids	+++	++	+++	+++	+++	+++	51
Pale palms	+++	++	+++	+++	+++	+++	47
Pale feet	+++	++	+		+++		23
Not active	+			++	+	++	15
Loss of appetite	+	+	+	+		++	11
Prompted							
Loss of appetite	+++	+	++	+++	++	++	37
Pale nails	++	+++	+++	++		++	32
Not active	+++	+	++	++		++	28
Pale lips		++	++	++		++	22
Pale tongue		+	+++	++		+++	22
Puffy face		++	++	+++		++	20
Failure to thrive		+	+	++		++	14
Pale palm	+	+	++	+	++	+	11
Loss of weight					++		5
Not known							
Failure to thrive	+++	+++	+++	++	+++	++	46
Puffy face	+++	++	++	++	+++	++	38
Pica		+++	+++	+++		+++	36
Not active		+++	++				13
Pale tongue		++	+	+		+	12
Pale lips		++	+	+			8

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

reasons. Paracetamol and chloroquine were given for treating fever, making the child healthy, and preventing illness. Vitamin B complex and multivitamins were given to treat loss of appetite. Antibiotic powders (ampicillin or amoxicillin) were used for a sore in the stomach (abdomen), rashes, diarrhea, and convulsions. In general, urban mothers said they used medicines and tonics more than rural mothers said they did, probably because of easy access.

Attitudes toward Iron Supplementation

All participating groups were willing to give iron supplements to their children (Table 2.8). Liquid preparations were preferred because they can be administered without difficulty. Participants who preferred a powdered preparation did so because it can be mixed with food. Some rural participants preferred injectable iron because it goes straight into the blood. The urban participants were against injectables because injections have been known to deform some children; examples were cited.

About one-half of the participants said the color of the supplement was not important because the ability to treat or to prevent sickness was more important than the color of the preparation. They added that children do have problems with the taste rather than the color of a drug. Most participants who had a preference for color stated they preferred a red color because it looks like blood. A white color was also mentioned because it could be mixed in food without being conspicuous.

All participating groups said they would be willing to use a daily iron regimen and would do so until the supplements were finished. Participants also said they would add sprinkles to their children's food and provide separate servings of food for the children in order to add the sprinkles. The lay key informants expressed confidence in the ability of health workers to introduce sprinkles. They thought that mothers would be willing to give sprinkles to

Table 2.7. Treatment and prevention of shortage of blood[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Spontaneous							
Food	+++	+++	+++	+++	+++	+++	57
Medicine	+++	++	+++	++	+++	+	33
Herbs	++			+	++		12
Blood transfusion	+		+	+	+		6
Supplements				+++			9
Injections	+			+			5
Fortified food	+			+	+		6
Prompted							
Blood transfusion	+++	+++	+++	++	+++	++	45
Injections	++	++	+	+	++	+	24
Medicine		++	++		+	++	17
Supplements		+		+		+++	9
Herbs	+++						8
Food		+	+				3
Fortified food	++	+++	++		++		21
Don't know about							
Supplements	+++	+++	+++		+++	+	42
Injections	+	++	+++	++	++	+++	31
Experience of shortage of blood							
Yes	+++	+	++	+	++		24
No	+	+++	++	+++	++	+++	36
Age of experience							
Under 6 months		+	+	+			3
6–11 months	+	+	+		+		6
1–3 years	++	+	++	+	++		12
4–5 years	+				+		3
Treatment given for shortage of blood							
Food	+++	+	+	+	+		13
FAC/blood tonic	+	+			+		5
Blood transfusion							0
At hospital			+++	+			6
Recovered from shortage of blood							
Yes	+++	+	+++		+++		20
No	+	+		+			4
Problems associated with treatment							
Yes	+	+		+			4
No	+++	+	+++		+++		20
Can prevent shortage of blood							
Yes	++	+++	+++	+++	+++	+++	53
No	++					+	5
Don't know		+	+				2
How prevent shortage of blood							
Food	++	+++	+++	+++	+++	+++	51
Kontomire		+++	+++				14
Red palm oil		++	+++				14
Fish		++	+++				13
Eggs		++	+				7
Ayoyo		++					5
Tonics		+					2
Medicines		+		+			4
Tried measures							
Yes	++	+++	+++	+++	+++	++	44
No	++	+	+	+	+	++	16
Any problems after trial							
Yes							0
No	++	+++	+++	+++	+++	++	43
Don't know			+				1

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

Table 2.8. Use of tonic and medicines[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Use							
Yes	+++	+	+	+++	+++	+++	45
No		+++	+++				15
Source							
Hospital	+++	+		+++	++	++	31
Chemical sellers	+++		+	++	++	++	27
Bush	++			+			7
What types							
Tonics	+	+	+	++	++		16
(Madame Catherine tonic)		(+)		(+++)			(6)
Paracetamol syrup	+			++	++	++	18
Chloroquine syrup	+			++		++	12
Vitamin B complex	+	+		++		++	14
Multivite	+			++			6
Ampicillin				+		++	6
Amoxicillin				++		+	7
Herbs	++			+			7
Willingness to give iron supplements							
Yes	+++	+++	+++	+++	+++	+++	60
Form preference							
Liquid	+++	+++		+++	+++	+++	47
Powder		+	+				4
Any form	+	+	+++				9
Color preference							
No preference	+++	++	+++		++	+	33
Red		++		++	+	+	15
Brown				+		+	6
Yellow			+		+		3
White		+		+			2
Green						+	1
Daily iron regime							
Yes	++	+++	+++	+++	+++	+++	56
Don't know	++						4
Duration							
Until supplements gets finished	+++	+++	+++	+++	+++	+++	60
Distribution preference							
Child Welfare Clinic	+	+++	+++	+++	++	+++	41
Kintampo Health Research Center	+++		+		+		12
Community clinic attendants		++	+	+			9
Traditional birth attendants		+					1
Assemblyman				+			1
Chief					+		2
Self			+				1

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

their children because, if the sprinkles were not good, doctors would not introduce them. The lay key informants also said that mothers would give doctor-prescribed medication to their children, but only for about 3 weeks duration. In contrast to the lay key informants, health workers had some reservations. Some believed that mothers are stubborn, would not follow instructions, and thus would not stick to a long iron supplement regimen. Again, these opinions may be the product of the health workers' misconceptions and negative assumptions about women. Nevertheless, the health workers acknowledged that if mothers understood the rationale for introducing iron supplements, they might adhere.

The chemists thought the best delivery channels for sprinkles would be through hospitals and chemists whereas health workers, particularly public and community health nurses, thought that they must be delivered through the Child Welfare Clinic. These responses were expected, legitimate, and similar to those of the mothers.

Decision-making for Seeking Health Care

The key informants noted that the decision-making process in seeking health care occurs mainly between the sick child's father and mother. The mother usually recognizes the sickness and informs her husband, and then they decide what action to take (Table 2.9). Other family members may be consulted. Elders in particular are deemed to have much experience in childcare. There was a consensus among most of the participating groups that fathers decide when and where to seek treatment when children are ill because they have the money to pay and they control household resources.

Three groups of participating urban women mentioned that mothers make the decision about seeking health care. By implication, urban women who controlled their own financial resources were the very few women who decided. Thus, those who decided about seeking treatment were also responsible for paying for the treatment.

On the issue of preventive care, most mothers indicated that they attend the routine weighing and immunization clinics. The decision to use this service was mainly made by mothers although fathers are sometimes involved.

Table 2.9. Decision-making process[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Child needs treatment							
Father	+++	+++	+++	+++	++	+++	49
Mother		+	+		++		7
Grandma						+	2
No response	+						2
Agreement							
Yes	++	++	+++	+++	++	+++	47
No							0
Consultation							
Yes	++	++	+++	+++	++	+++	47
No	++	++			++		13
Who was consulted							
Mother		++	+	+++		+++	17
Grandma	+						3
Close relations	+		+++	++	++		22
Final decision							
Father	+++	++	+++	+++	+	+++	36
Mother					+		2
Grandma or grandpa			+			+	3
Anyone		+			+		2
Sister					+		1
No response	+						3
Who pays							
Father	++	+++	+++	+++	+++	+++	49
Mother	+			+	+		7
Grandma						+	2
Other relations	+	+					2
Use of immunization or weighing services							
Yes	+++	+++	+++	+++	+++	+++	58
No		+					2
Who makes decision							
Father	+	++	+	++			11
Mother	+++	++	+++	++	+++	+++	47
No response		+					2
Who pays							
Father	++	+++	+++	+++	+	+	33
Mother	++	+	+	+	+++	++	24
Grandma						+	1
No response		+					2

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

Urban mothers were more likely to make such decisions than rural mothers. Interestingly, fathers make the payment for health care more often than mothers. However, urban mothers were more inclined to make such payments than were rural mothers.

Health Care Options and Use

The prominent persons (traditional, social, and political leaders—chiefs, local assembly members, traditional health practitioners, religious leaders, etc.) in the communities said that both traditional and allopathic health care services are available. Nonetheless, the hospital was viewed as the place to have a sick child examined for diagnosis of illness.

Hospitals followed by healers and chemical sellers were the options most common to all participating groups (Table 2.10). In addition, the urban participants indicated having greater access to and using the services of chemists more than did rural participants. The most commonly used service in both urban and rural areas was the hospital or health center. Traditional herbal treatment may be losing popularity among some urban mothers, as indicated by their negative reactions to the topic. Nonetheless, one urban northern ethnic group mentioned using the services of herbalists.

The urban focus group discussion participants also identified the hospital, although five groups mentioned chemists. Only one group of urban participants mentioned herbalists as the most frequently used option.

The use of other options was influenced by the deterioration of the patient or when the illness became an emergency, the type of illness, and the time for recovery (i.e., persistence of the illness longer than the expected period for recovery). Only two respondents mentioned cost of care as a factor in decisions about options. Medical pluralism per se was not practiced in all communities, although the pattern was to first resort to home treatment before seeking care at a clinic. Home treatment included using drugs leftover from a previous consultation, sharing a neighbor's or relative's prescription, purchasing drugs from chemical sellers, or using herbal preparations.

Potential Source of Iron Supplements

The best way to make iron supplements including sprinkles available to mothers is to distribute them through the Child Welfare Clinic and the Kintampo Health Research Centre.

Table 2.10. Use of different health care options[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Options available							
Hospital/health center	+++	+++	+++	+++	+++	+++	58
Traditional healer	+++	+++	+++	+	+++		38
Chemical sellers	+++	+		++	+++	+++	36
Prayer				+			1
Frequently used							
Hospital/health center	++	+++	+++	+++	+++	+++	48
Chemical sellers	++			+	+++		16
Traditional healer		+	+		+++		10
Prayer				+			1
Use of other options							
Yes	+++	+++	+++	+++	+++	+++	60
Circumstances							
Seriousness	+	+++	+	++		+	20
Emergency	++						5
Type of illness		+	+++	+		++	14
Other	+	+					3
Cost				+			2
More than one option used for same illness episode							
No	+++	+++	+++	+++	+++	+++	60
Options for delivery of supplements							
Child Welfare Clinic		+++	+++		+++	++	30
Kintampo Health Research Center	+++			+		++	17
Community clinic attendants		+	+	+++			10
Traditional birth attendants	+						1
Hospital		+					2

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

Mothers attended the Child Welfare Clinic monthly and the workers of Kintampo Health Research Centre had time to distribute the supplements during their home visits. However, nearly all groups participating in the focus group discussions had a preference for the Kintampo Health Research Centre because the supplements are likely to be given free of charge. Other distribution options were through hospitals and by community personnel (e.g,. assembly persons, community clinic attendants, traditional birth attendants, and chiefs), but the latter were a minority view.

Again, the focus group discussions identified chiefs as a channel in the local communities. Rural participants also suggested personnel within the community health structure, such as the traditional birth attendants, because they have been trained and are recognized to be concerned with child care, and community clinic attendants, because they have been trained to dispense drugs.

Child Feeding Practices

One-half of the respondents gave complementary food between ages 4 and 6 months (Table 2.11). A significant number of rural mothers, but less so urban mothers, gave complementary food earlier or later than the prescribed practice. Most mothers gave mainly *koko* to their children. Rural mothers stated that they gave weanimix as well whereas some urban mothers said they gave groundnut soup.

The most-stated frequency of child feeding was three times per day. Few respondents stated that they freshly prepared the food for children when they were to be fed. All mothers indicated a willingness to add sprinkles to the feeds for their children.

Lay key informants stated that mothers usually introduce complementary feeding at about age 6 months. The type of food given varied by age, because young children cannot take solid foods. Some mothers gave their children fortified foods (lactogen, babylac, and cerelac) that had been recommended by the health workers. Young children below age 4 years received separate servings and were fed by their mothers. From about age 4 years, children eat together from one bowl because this fosters unity among them.

Table 2.11. Child feeding practices[a]

	Rural			Urban			
	Asante kwaa	Portor	Krabonso	Nwoase	Fanyinama	Mo	Total
Age at supplementary feeding							
Under 4 months	++	++	+	+	+	+	16
4–6 months	++	+	++	+++	++	++	30
Above 6 months	+	++	+		+	+	14
Types of complementary food							
Koko	+++	+++	++	++	+++	+++	49
Weanimix	++	+	+	+			11
Groundnut soup				+	+	++	12
Tinned foods				++	+		7
Tom brown				+			1
Frequency fed per day							
1		+	+				2
2				+		+	2
3	+	+++	+++	+++	+++	++	37
4	+	+	+	+	+	+	13
5 plus	++	+		+			6
Fresh preparations							
Yes	++	+	+	+		+	12
No	++	+++	+++	+++	+++	+++	48
Willingness to give sprinkles							
Yes	+++	+++	+++	+++	+++	+++	60
Separate servings							
Yes	+++	+++	+++	+++	+++	+++	60
Variations for age							
No	+++	+++	+++	+++	+++	+++	60
Who gives feeding							
Mother	+++	+++	+++	+++	+++	+++	60

[a]n=10 for all groups. + indicates 1–3 responses, ++ indicates 4–6 responses, +++ indicates 7–10 responses.

Discussion

The understanding of anemia in children by mothers, caretakers, and other household members is closely linked to their understanding of health in general (i.e., how food nutrients such as iron interrelate with blood and health). The results show that there was a high degree of convergence between the responses from the in-depth interviews and the focus group discussions. There were no significant ethnic and locality differences. Perceptions of health mainly related to the functional activities of the child. In a few instances, mothers related health to medical conditions, symptoms, or signs (e.g., fever, respiratory rate, and constipation). The traditional belief system for spiritual causes of ill health or sickness was not mentioned. This may suggest that traditional knowledge on causation of illness is being replaced by modern biomedical explanations. It may also be that responses were tailored to suit the knowledge background of the interviewers who were health workers. Because the issues explored in this study were knowledge based, their practice may be questionable because many factors affect the interplay between knowledge and practice. Moreover, the fact that people may repeat what they have been taught, especially by health workers, cannot be overlooked.

Food was seen to have physical, mental, and social dimensions for the child. Physically, food provides strength for and leads to growth. Mentally, it leads to satisfaction and happiness. Socially, adequate provision of food may enhance parental control over child behavior (i.e., ensuring obedience of children).

Foods perceived to be good for children were mainly of plant origin, partly because most people have only limited access to animal foods. Among animal foods, fish may have been preferred over meat and eggs because it is less expensive. The fish most often cited was anchovy, which is relatively inexpensive compared with both large fish and meat and has been promoted at child welfare clinics for preventing undernutrition in children. Food prepared without sauce was considered to be bad food for children.

Food, blood, and health were thought to be related to strength and energy; that is, blood provides strength and makes children healthy whereas food provides energy, strength, and blood, thus making children healthy. Food was also related to health from a psychosocial dimension; it makes children satisfied and happy. A few mothers mentioned that food protects against infection. Iron was not known as a specific component of food that promotes blood formation; people spoke of a shortage of blood rather than blood problems related to iron deficiency. In general, the concept that specific nutrients in foods have specific health functions in the body were not well understood, although mothers were very knowledgeable about some foods that can enhance blood formation (e.g., dark green leafy vegetables, fish, and eggs). Even though food was seen as a variable means of maintaining and improving child health, a strong link was seen between food and blood, and this link was seen as being responsible for providing strength and making children healthy. This belief could be built upon.

The association between blood and good health was also reflected in mothers' responses to the characteristics of a child being healthy and having adequate blood, being active and playful, eating well and having a good appetite, and growing well and gaining height and weight. Loss of appetite, refusal to eat, inactivity, and loss of weight were considered symptoms and signs of a shortage of blood or anemia.

Other signs that mothers associated with a shortage of blood in young children were pallor of the eye lids and pallor of the palms. However, other important signs such as pallor of the tongue, inactivity, failure to thrive, and weight loss were not well recognized. Although shortage of blood was noted to be more common in rural than urban communities, as expected, no evidence suggested that rural mothers were better able to recognize the symptoms and signs of a shortage of blood than were urban mothers. The problem of a shortage of blood in children is recognized but only one-half of the respondents perceived it as a condition common in communities. If this is the case, the introduction of an iron supplementation program needs to take this into account because this perception may influence program effectiveness.

The explanation for a shortage of blood related to hemorrhagic, hemolytic, and iron deficiency anemia. For children a shortage of blood was more often related to the diet than to the other two types of anemia and generally to eating bad food (i.e., not eating an adequate diet) rather than to eating food deficient in nutrients. Communities appeared to perceive blood to be synonymous with food in terms of its role in the body. Because blood was seen as providing strength and protection and making a child healthy, it was to be expected that people would identify that a shortage of blood was the problem most real to them.

Fever and exposure to hot sun were mentioned as causing a shortage of blood. This was probably because the sun produces heat and prolonged exposure increases the temperature of the skin similar to the effects of a fever. There was also a close association between fever and malaria, which is endemic in Ghana. Malaria is an important causal factor in anemia, especially for children in this area, although mothers do not differentiate between fever and malaria. For mothers they are the same thing because most fevers in children are due to malaria.

Blood defects as regards quality (morphologic type

of blood cell and adequate platelets) and consistency were not obvious to mothers and, therefore, were not often referred to. Spoiled and dirty blood was mentioned, which can be associated with the quality of blood. There were no local terms or phrases reflecting problems associated with the quality of blood, and respondents generally spoke of the quantity rather than the quality of blood.

Health-seeking behavior was influenced by the main actors in the decision-making process in the home, which tended to follow the traditional pattern of male dominance. Fathers are the final decision-makers for when and where to seek treatment for a sick child, although some consultation with mothers and other family members may occur. Decision-making is closely linked with the expected financial obligation of the father or household head when such situations arise and, traditionally, household heads are expected to be responsible for the needs of all the people under their roof. Today, however, mothers are contributing significantly to the decision-making process because they now share financial responsibilities, especially in urban areas where they may be better able to earn money than in rural areas.

Decisions to seek promotive and preventive health care and services, such as growth monitoring and immunization for children, are largely made by mothers. The reason for this is because these services are free of charge. Cost is therefore likely to be an important factor influencing the use of supplements and imposing a cost may constrain their use. It would also place the decision to use them or not within the decision-making sphere of fathers.

Although allopathic health care is not easily accessible in the district, mothers said they used hospital services much more than they were expected to. The implication is that mothers put a lot of effort into reaching the few facilities available, probably because of the perceived quality care provided in these facilities. It was anticipated that herbal medicine would have been resorted to first in the rural areas, but this was not so. Serial use of health care options does occur, after home-based treatment has been tried, and the decision to use other options is based on the state and type of illness and the belief systems concerning the illness.

Having an appropriate delivery system for health care interventions, such as supplements, is vital for ensuring their successful use and effectiveness. Most mothers said they would prefer health workers to distribute iron supplements if such a program was initiated, which reflects the confidence mothers have in the promotive and preventive services rendered by these workers. This confidence was further reflected by the mothers' saying that they were prepared to give supplements to their children for any length of time prescribed by clinicians or health workers. Despite this, there is a need to address the misconceptions and negative assumptions of some health workers that emerged during this study.

Hospitals were least preferred as a source for iron supplements because the government has started a cost-recovery program in these institutions. The Child Welfare Clinic and Kintampo Health Research Centre were regarded as free and health workers were the preferred channel of distribution for supplements. Despite the concern about having to pay for services, chemists are used in urban areas, which may reflect the increasing trend of self-medication in such communities. Chemists are accessible and it is less time consuming to get the treatment from them. Moreover, the cost expended is lower because a partial course of treatment (a few tablets) can be bought rather than a complete course, and the payment arrangements are more flexible. Thus, chemists may be an option for delivering iron supplements to children in the urban setting. Nonetheless, further studies are needed to ascertain the feasibility and viability of this option as an effective supply system and also how it would influence long-term adherence.

The acceptance of iron supplements for children may be influenced by the form and color of the supplement. Mothers said they preferred liquid medications over other forms, such as tablets, because children do not have difficulty swallowing this form, which conforms to the usual administration of syrups to infants and young children. Despite this, the acceptance of a powdered form of supplements may be influenced by prevailing child feeding practices. Powdered supplements can be mixed with the porridge given to young children as complementary foods. They can also be mixed with soups that accompany servings of traditional *fufu* and *abetie*.

For children over age 4 years, powdered supplements may not be a good solution because two or more children of the age group traditionally eat from the same bowl. Mothers did, however, show a willingness to give separate servings of food to their children if a supplement is to be added to prepared food. This would need to be tried and tested.

Color preference may not be a problem for mothers, especially those in urban areas. Rural mothers suggested a red color preference for tablets and syrups because red is associated with blood. Thus, consideration may need to be given to coloring supplements, especially in rural areas and low socioeconomic settings that are likely to be the main target for iron supplementation programs. Nonetheless, red coloring of sprinkle supplements would discolor the food, which may or may not be acceptable to mothers. Further studies on color use are needed.

In conclusion, this study has offered insight into mothers', caretakers', and household members' understanding of the associations among food, blood, and

health. Iron deficiency anemia as biomedically defined is not understood, but there are local descriptions of an inadequacy of blood that affects young children and corresponds to anemia and its consequences for child health. A strong link was seen between food and blood, which may provide an opening for nutrition education activities to build upon. Mothers expressed willingness to give supplements to their children; because mothers make the decisions about seeking promotive and preventive health care for children, this provides a positive advantage for introducing an iron supplementation program for children. The imposition of a cost, however, would create a constraint to the use of iron supplements. In relation to supplement form, mothers expressed a preference for liquid supplements because of ease of administration but said they would be willing to use sprinkles. The traditional feeding practices for children below age 4 years are conducive to using iron sprinkles because these children are fed by using a plate and spoon; this does not hold for older children because they eat from a common bowl.

Although overall improvement in the both the quality and quantity of complementary food intake for older infants and breast-feeding practices for young infants remains the long-term option, this study shows that in the short term, supplementation to control anemia in infants and young children is acceptable in sociocultural terms and that there are factors to encourage its use. Further studies are needed, however, to evaluate the relative acceptability and effectiveness of different forms of supplementation, the most appropriate distribution channels, and long-term adherence.

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3: FINDINGS OF THE NEPAL COUNTRY STUDY

Ram Shrestha

Background

Nepal represents a rural setting with a very poor public sector health infrastructure. Both the rate of child mortality and undernutrition are very high.

Prevalence of Anemia in Children

Since the National Nutritional Survey of 1975, no national studies have been conducted to assess the prevalence of anemia in Nepal. Data available from a few localized studies conducted in selected areas of the country suggest that anemia is widespread in at least some parts of the country (Table 3.1).

Anemia Control Policies and Programs

The National Anemia Control Program distributes iron and folate tablets to pregnant women through health facilities in 60 of the country's 75 districts (80%). In 1995 a new strategy was developed whereby prenatal iron and folate tablets are distributed by the female community health volunteers and other front-line health workers.

The Ministry of Health does not have a specific policy or program for pediatric iron supplementation. The ministry, however, does have a policy for using mebendazole tablets to deworm all children above age 2 years in rural areas. This is through the Joint Nutrition Support Program as an anemia prevention activity. Community workers distribute the tablets twice per year. As part of the Preventing and Controlling Specific Micronutrient Deficiencies Project, plans have been made for expanding the deworming policy to include the biannual distribution of vitamin A capsules (Anonymous 1986), but this has not yet been implemented.

Table 3.1 Summary of the data on prevalence of anemia among children in Nepal

Survey	Age Group	Prevalence	Year	Reference
National Nutrition Status Survey	6-23 months	19%	1975	His Majesty's Government of Nepal, United States Agency for International Development-Nepal (1975)
	24-72 months	26%		
Blood diseases in Kanti Children Hospital over the 5-year period	0–15 years	Mild 6% Moderate 46% Severe 48%	1974–1978	National Nutrition Strategy in Nepal. (Based on the Report of the Second Workshop on National Nutrition Strategies, Pokhara II, 29 May – June, 1986). National Nutrition Policy Coordination Committee, National Planning Commission, Kathmandu Nepal. June 1986
Family Health Project, Institute of Medicine	<5 years	6%	1986	Master Plan of Operation, 1996–2001. Country Program of Cooperation between His Majesty's Government of Nepal and the United Nations Children's Fund. Monthly Bulletin, Institute of Medicine, 1986
Anemia Survey in Surkhet District, SCF (UK)	<5 years	33%	1982	Shrestha (1983)
A study on factors influencing the nutritional status of adolescent girls.	Adolescent girls	Dang - 22% Rolpa - 84%	1994	Regmi and Adhikari (1994)

Review of Relevant Ethnographic and Qualitative Studies

No relevant ethnographic studies have been found for Nepal. The study that looked at factors influencing nutritional status of adolescent girls collected data only on prevalence of anemia (Regmi and Adhikari 1994). There was no study found that looked at the issue of blood and factors that may influence blood quality.

Study Setting

The study was carried out in Saptari District, Sagarmatha Zone, in the eastern development region of Nepal. Two of the 162 *Ilakas* of Saptari District were selected as a study site (Sitapur and Kanchanpur; each district has 10–15 *Ilaka* health posts). The two *Ilakas* cover 21 of the 114 village development committees in the district: 9 in Sitapur and 12 in Kanchanpur. Table 3.2 shows some of the characteristics of the study sites. Both *Ilakas* are about a 45-minute bus ride from Rajbiraj, the district headquarters of Saptari District. There is one zonal and one district hospital in Rajbiraj.

There are no district-specific data on mortality and undernutrition, but the national data show that the child mortality is 116/1000 and that 64% of the children are stunted.

Research Methods

The research methods described in Chapter 1 were followed. The sample population comprised three ethnic groups representing the study area: the speakers of Nepali, who are migrants from the hilly region of the zone, not indigenous inhabitants of the area; speakers of Maithili, who are local inhabitants and mostly of Indian origin; and speakers of Tharu, who are also indigenous to the area and who also speak Maithili but have a range of unique sociocultural behaviors (e.g., in relation to matrimonial ceremonies, religious rites, and food practices) that are quite different from the Maithili-speaking group.

Within each study site, respondents were selected on the basis of ethnicity and geographic location. Participating women were identified and selected as follows: The distribution of the different ethnic groups at the ward level in the two *Ilakas* was determined. In each *Ilaka* one village development committee was selected from the village development committees grouped by ethnicity. One ward was selected within each selected village development committee. Within each ward a village enumerator inquired as to whether households had any children under 5 years of age. If the answer was "yes," the enumerator asked whether the mother was at home and asked the family members (husband, father-in-law, mother-in-law, etc.) for their permission to interview the mother. If permission was given and the mother said that she had time for the interview, she was interviewed. Where there was not a child under age 5 years or the mother had no time, the enumerator went to the next household and continued as above.

The individuals selected to be key informants were familiar with the issues relating to child health, anemia, and health-seeking behaviors of the mothers. They included all the health workers working in the community and in the health centers: auxiliary health workers, ancillary nurse midwives, maternal child health workers, village health workers, female community health volunteers, and traditional birth attendants.

The original information guide developed at the workshop in London was translated into Nepali and pretested on mothers of different ethnic groups in villages in two districts not included in the study (Bhaktapur and Lalitpur). The questionnaire was modified based on the findings of the pretest (see Appendix 1). The investigators worked very closely with the health centers of these two *Ilakas* and the district health office and also informed the village development committee chairman and ward member. The study was discussed informally with the Nutrition Section of the Child Health Division at the central level, but no written approval was sought.

Table 3.2. Characteristics of the study sites: Sitapur and Kanchanpur *Ilakas*

Description	Sitapur *Ilaka*	Kanchanpur *Ilaka*
Total population	862,602	110,954
Women of reproductive age		
Number	162,521	22,194
Percentage	18.8	20.0
No. children aged <5 years		
Number	12,264	15,534
Percentage	1.4	14.0
Health posts	1	1
Sub-health posts	62	9
Private clinics	Few	Few

Results

The findings from the in-depth interviews are summarized by language group in Tables 3.3–3.13. Where relevant, issues raised by the key informants are included, otherwise their responses conformed to the information gathered through the in-depth interviews and focus group discussions.

Perception of Health

Almost all of the interviewed Nepali- and Maithili-speaking mothers recognized healthy children by their physical appearance and activity (healthy children were strong and stout) whereas Tharu mothers recognized healthy children by the absence of disease (Table 3.3). In the focus group discussions respondents also mentioned the absence of diseases and infection as characteristics of healthy children.

Respondents believed that food was the main reason for a child being healthy or unhealthy. Some respondents also said mothers should provide their children with proper care from a very early age, which meant that the child should not be allowed to cry and should be loved. A few mothers remarked that not only food but also frequent feeding, mixed food, adequate breast-feeding, and the use of *khol* and oil massages were necessary to make a child healthy. Mothers said that disease and bad food were the main reason for children becoming unhealthy.

Mothers mentioned that children below age 5 years were more prone to getting diseases than were other age groups because they are not able to protect themselves from disease and infection and they need more care. Maithili and Tharu women remarked that boys were more prone to get diseases than the girls because girls are more resistant to infection. Girls are referred to as *katajivi*, that is, stronger or not vulnerable to disease.

A very few key informants said that blood tests could be used in addition to a child's activity level and appearance to determine whether the child was healthy. Moreover, they opined that the health status of the mother, season, and both the quality and quantity of food eaten were the main determinants of a child's health status. Some health workers said the health status of the children depended on genetic factors. Most of the mothers also stressed that vaccinations were necessary to make a child healthy.

Association between Food and Health

Mothers from the three ethnic groups stated that food makes people healthy, gives energy, protects against disease, or helps them to become alive, although Nepali speakers did not mention food as giving energy and the Maithili

Table 3.3. Health perceptions[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Healthy child			
Good physical appearance	++++	++++	+
Active	++++	+++	+
Absence of disease or infection	+	++	++
General outlook	+	+	
Unhealthy child			
Inactive	+++	++	+
Poor physical appearance	++	++	
General outlook			
Presence of disease or infection	++	+++	++
Factors making a healthy child			
Food	++++	++++	+++
Care	+++	++	+
Hygiene or sanitation	++	++	+
Medicine	+	+++	+
Factors making a unhealthy child			
Bad food	+++	++	++
Lack of care	+	+	+
Disease	++	+++	+
Hygiene or sanitation	+	+	
Association with age or sex			
Same for both sexes	++	+++	+++
Same for all ages	+		
Greater in children <5 years age	++	+++	+++
Girls more than boys			+

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

speakers did not mention that food protects from disease or that it helps them to become alive (Table 3.4). A few Tharu speakers said that food helped build the body whereas a few Maithili speakers were more specific and said that food helped children grow. Mothers considered foods from animal sources as good for health, with cow milk being the best. Most mothers said that among plant foods green leafy vegetables are the best for health, but they had no ideas about the function and roles of different foods and how they make children healthy. In the focus group discussions, red amaranth, spinach, and *sarainchi* (a local medicinal herb) were said to be the best green leafy vegetables. Red amaranth is known as *nirdosh saag*, which means innocent, because it never affects health adversely. Most Tharu- and Nepali-speaking mothers mentioned that imported formula food, *lito* (a mush prepared for children from wheat, other cereals, and legumes), and mashed food are good for children below age 2 years. Despite this, only the mashed food, especially the *dal* (lentils) and *bhat* (boiled rice), were fed often to children.

Most mothers stated that stale, unhygienic, and contaminated foods are bad for a child's health. Some Tharu mothers mentioned oily foods as being bad for health. Opposing views were expressed regarding the consumption of millet and maize: some in the Nepali-speaking focus group discussions said they were bad whereas others said they were good.

Overall, mothers had a good understanding about the importance of food to health, but the function of individual food was unknown. Key informants confidently stated that an inadequate intake of food leads to different nutritional deficiencies and that foods rich in energy, protein, and vitamins and minerals were necessary for the good health. They stressed that *sarbottam pitho* (a super flour made up of equal parts of two types of whole grain cereal maize and wheat and twice the amount of pulses) is the most essential nutritious diet for children between ages 6 and 18 months.

Association between Food and Blood

Mothers confidently stated there was a strong association between food and blood (Table 3.5). They said food helps to keep blood healthy and blood is made from food. Most key informants also thought that food makes blood but few knew how. Very few respondents stated that iron-rich food is needed to make blood, and most were unable to describe the role of iron in reference to blood and health. A few key informants stated that vitamin C helps to absorb iron from the food. A very few key informants said that a reduction in red blood cells would cause anemia.

Mothers said that milk and curd, green leafy vegetables, meat and fish, and fruits are good for the blood because they help to increase the quantity and purity of blood. One caste of the Nepali-speaking group believed that postpartum consumption of fresh animal blood with a few drops of lemon was good for the blood but did not know why. In addition, most key informants recognized that green leafy vegetables are rich in iron. There was a strong belief among the Maithili and Tharu groups that *lal murasa* (red amaranth leaves), *singhi* (cat fish, *Saccobranchus fossilis*), *mungri* (clarius, *Clarias batrachus*), and *anai* (eel fish, *Mastacembellus aematus*) increase blood volume.

Sour foods, especially fermented fruits and pickles; but also raw mangos; very spicy foods; and dry foods were considered bad for the blood because these foods break blood down into its constituents and can cause diseases. Some key informants also said that inadequate intakes of iron-rich food caused a shortage of blood.

Table 3.4. Association between food and health[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Association between food and health			
Makes healthy	+	+	+
Give energy		++	++
Protect from disease	+		+
Helps to become alive	+		+
Good foods			
Animal source	++	+++	+++
Plant source	+++	++	+++
Specific foods	++	+	++
Bad foods			
Stale food	++	+	++
Contaminated food	+++	+	+
Indigestible food	+		+
Chilly or hot and sour	+	+	

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

Table 3.5. Association between food and blood[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Food associated with blood	+++	++++	++++
Association			
Keeps blood healthy	+	+	+
Food makes blood	+	++	++
Good foods			
Milk, curd	++	+++	++
Green leafy vegetables	++	+	++
Meat and fish	++	++	+
Fruits	+++	++	
Bad foods			
Raw mangos			+
Pickles	+	++	++++
Same type of food always			+

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

A few respondents also identified several traditional beliefs. These included that consuming water in the months of December and January helps to increase blood volume, consuming the juice extracted from squeezing red amaranth helps to keep menstrual periods regular, and consuming water left overnight in a container with sesame seeds is good for cleaning (purifying) the blood.

Association between Blood and Health

Study participants strongly agreed that there is an association between blood and health (Table 3.6). Blood helps a person to become healthy and gives energy, and life is not possible without blood.

Mothers were familiar with the dark red color of blood and said this color indicates that a person is healthy. Key informants noted that blood makes a person red faced. Black blood was not considered good and reflects that a person is unhealthy.

Mothers also believed that concentrated blood was good for health and that concentrated but not very thick blood helps a person become healthy and stout. Because blood has to circulate in the body, blood that is too thick is not good. Almost all key informants said that very dilute blood is bad and leads to many diseases and infections. Most key informant health personnel said that concentrated blood contains enough red and white blood cells to keep a person healthy and that an increased number of white blood cells indicates that a person has an infection.

The quality and quantity of blood should be that required by body, not more and not less; both will lead to diseases. Very dilute blood makes people weak, thin, and unhealthy and leads to disease. Some mothers also said that consumption of alcohol and narcotics can lead to the breakdown of blood. The loss of a lot of blood by a woman during delivery also leads to weakness, paleness, and other diseases. A very few Maithili mothers said that dilute blood could result in edema.

Food and diseases were thought to be the main reason for blood being dilute or concentrated. In some focus group discussions, participants said that consumption of excessive amounts of food concentrates the blood. Diseases were thought to change the consistency of blood. Participants mentioned that alcohol and narcotics could dilute and cause changes in blood. Some key informants said that less intake of iron-rich food results in the dilution of blood and that a reduction of red blood cells also causes blood dilution.

Mothers thought that green leafy vegetables, milk and curd, or medicines keep blood in good condition. Key informants stated that eating green leafy vegetables, fruits, pulses, meat, fish, and, for infants, breast milk were the best way to maintain blood quality and quantity because these foods are good sources of iron. Some mentioned that iron from vegetable sources is poorly absorbed, and a few said that consumption of vitamin C–rich foods enhances the absorption of iron.

Signs and Symptoms of Anemia

Health care providers identified iron deficiency as a main cause of anemia but they also mentioned that diseases and infection cause changes in blood quality. Mothers understood anemia to be a shortage of blood. The ability of mothers to identify the signs and symptoms of anemia varied among the different ethnic groups (Table 3.7). Most of the Nepali-speaking mothers identified anemia signs and symptoms more easily than did the Maithili- and Tharu-speaking mothers, who responded positively only after prompting. The symptoms spontaneously identified included weakness and tiredness and a pale face. With prompting, respondents also said numbness and a tin-

Table 3.6. Association between blood and health[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Blood associated with health	++++	++++	++++
Association			
Helps to become healthy	+	+	++
Gives energy	++	++	+
Helps to be alive	++	+	+
Dark red is good color of blood	+++	++++	++++
Consistency of blood			
Good			
Concentrated	++	++	+++
Dilute	+		
Medium			
Bad			
Concentrated			+
Dilute	++	+	+++
Very dilute		++	
Reason dilute blood is bad			
Weakness	++++	++++	++
Illness or disease	++	++	++
Death		++	
Pale		+	+
Reason concentrated blood is bad			
Very fat	+	+	
Drowsiness		+	
Illness or disease	++	+	++++
Clots	+	++	
Factors that make blood bad			
Excessive food intake	++		+++
Alcohol or narcotics	+	++	+
Ways to keep blood in good condition			
Green leafy vegetables	+	++	+
Milk, curd		++	+
Medicines	+	++	++
Water		+	+

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

gling sensations in hands and feet; pallor or paleness of the nailbeds, eyelids, palms, and tongue; and puffiness of face. Health care providers were more specific in defining the symptoms of anemia, namely a loss of appetite, tiredness even on light work, giddiness, difficulty in breathing, and a puffy face.

Few participants associated pica with shortage of blood. When the issue was probed, mothers remarked that children who eat mud usually become pale. Pica was seen as a cause of anemia rather than as a symptom. One health care provider explained that pica resulted in worm infestations leading to anemia.

Children under age 3 years and pregnant women were said to suffer more from anemia than did other age or physiological groups. Mothers and health care providers were also aware that blood loss during childbirth causes anemia.

Treatment and Prevention of Anemia

Mothers said medicines and food such as green leafy vegetables, meat, fish, and milk should be given to people who are tired and lethargic (Table 3.8). Nepali speakers mainly mentioned green leafy vegetables and fruits. Tharu and Maithili speakers mainly mentioned animal sources (e.g. milk, meat, and fish). Few respondents mentioned red amaranths. One Nepali speaker mentioned fresh goat blood. Fortified foods were only mentioned by the Nepali group after prompting; Tharu and Maithili groups mentioned supplements and blood transfusion but, again, only after prompting. Injections were only mentioned after prompting.

Mothers also said they consulted health workers for treatment when a person had giddiness, numbness and tingling sensations in the hands and feet, puffy face, etc.

Table 3.7. Signs and symptoms of anemia[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Weakness and tiredness	+++	++	++
Pale face	++++	+++	+++
Pale nail beds	++	+++	++
Pale eyelids	++	+++	+++
Pale palms	++	++	++
Pale tongue		++	+
Puffy face	+	++	+++
Loss of appetite	++	++	++
Not active	+	++++	++++
Not playing		+	++
Thin and skinny	+	+	++
Pica	+	+	++
Failure to thrive	+	+	+

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

Mothers could not name the medicine they were given but could describe the medicine's state and color.

Health care providers treated anemia by deworming, prescribing iron-rich food, and prescribing iron supplements in whatever forms were available at the health post. A few mentioned treating severe cases of anemia with vitamin B complex and blood transfusion.

When asked whether anemia can be prevented, most mothers in all three groups said that anemia can be prevented (Table 3.9). Mothers said food prevents anemia and some mentioned supplements. Most mothers mentioned that animal-source foods could prevent anemia and a few Nepali-speaking mothers explained that the consumption of green leafy vegetables and fruit is appropriate for preventing anemia. Health workers gave similar responses and added proper breast-feeding practices and the consumption of lentil soup and fruits. Some Nepali-speaking mothers and the health care providers mentioned that consumption of vitamin C–rich food with iron-rich food increases the absorption of iron from the food. Some also mentioned that good hygiene and sanitation are important for preventing anemia. Some mothers suggested that using mosquito nets would prevent anemia. Most of the mothers who identified various preventive measures against anemia said they do not practice these measures and seek help from health workers only when a child becomes sick. Other preventive methods used by the mothers are consulting with faith healers and doctors and taking tonics and supplements provided by them.

Most mothers said they took the brown tablets provided during pregnancy but none was aware that these were iron tablets. Some mothers who took tablets complained about a burning sensation in the chest that prompted them to discontinue the medication. Some mothers had given their children a liquid iron supplement that was prescribed by a health worker or medical shop doctor. Most health care providers thought iron supplements were only for treating anemia, not for preventing it.

Attitudes toward Iron Supplementation

Most mothers were willing to supplement their children with iron if the health workers prescribed the supplement, because they considered it their duty to ensure the good health of their children. Some mothers, however, were not

Table 3.8. Treatment of anemia[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Medicine	+++	++	+++
Food	+++	+++	+++
Fortified foods	+		
Supplements	+	+	+
Blood transfusion	+	+	++
Injection	+	++	

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

Tables 3.9. Prevention of anemia[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Can be prevented	++++	++++	+++
Preventive measures			
Foods	+++	+++	+++
Supplements	+	+	
Medicines	+	++	++
Good hygiene or sanitation	+	+	++
Consult doctors		++	++
Consult healers			+
Tonics	+	+	++

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

so sure and said that it would not be necessary to give iron supplementation to a child if the child looked healthy. Few mothers were worried about side effects.

Mothers said that the preferred pediatric iron supplement is a liquid formulation with a red color and sweet fruity flavor (Table 3.10). A liquid was preferred over a powder to be added to food because there would be less wastage should children not eat all their food. Most mothers said that the taste of the supplement and the age of the child could be the main limiting factors in giving the supplement to the child. If a child was older than 1 year and if the preparation was not tasty, it would be difficult to feed the medicine to the child.

Mothers preferred a dosing schedule with flexible timing (i.e., not restricted to morning or evening dosing). They said that although it is difficult to remember to give

Table 3.10. Attitude toward iron supplementation[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Form			
Liquid	++++	++++	++++
Powder			
Tablets			
Injection			
Color			
Red	++++	++++	++++
White			
Yellow			
Taste			
Sweet	+++	+++	+++
Like breast milk	+	+	+
Problems in giving supplement			
Taste	+	+++	+++
Age	+++		+
Don't like medicines	+++		+
Side effects			
Yes	+		+
No	+++	++++	+++
Interval			
Daily	+++	++	+++
Monthly	+		+
Biannually		+	
As directed by the doctors	+	+	+
Duration			
As prescribed by the doctors		++	
Until the child becomes well			++
Until 5 years of age	++	++	++
Forever	+		

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

Table 3.11. Decision-making process[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Who is consulted when child is sick			
Grandparent	+	+	++
Father	+	+	+
Mother	++	++	++
Neighbor	+++	+++	+++
Decision-maker			
Mother	+		
Father	+++	++	++
Grandparent		+	++
Factors influencing whether advice is followed			
Types and seriousness of disease	++	+	+
Availability of money	+	++++	+++
Action taken in absence of family member			
Don't wait	++	+	+
Ask neighbors for help	+	++	++
Factors influencing taking action			
Not serious/money problem	+		
Only serious	+		
Serious or money problem	++	+++	+++

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

a supplement daily, if it is for child and prescribed by doctors they would follow the prescription. Many also said they would continue giving supplements until their child is 5 years old.

Decision-making for Seeking Health Care

Mothers first consult their husband and other family members when a child falls sick, but they are free to decide what action to take when family members are absent. Mothers emphasized that decision-making takes place within the family and neighbors are consulted when required (Table 3.11). Among the Nepali-speaking mothers, the sick child's parents were identified as the main decision-makers whereas among the Maithili- and Tharu-speaking women, grandparents were involved in making the decisions along with the father.

Affordability determined whether particular advice for treatment was accepted or rejected. Where there was a life-threatening illness, however, parents tried to provide treatment even if they had to borrow money from friends or neighbors. Mothers said that their ability to decide what action to take for a sick child would depend on the severity of illness. If no other family member was at home and the child became seriously sick, they were free to borrow money and take the child for treatment. If the illness did not seem serious enough, they would wait for the head of the house to come home and decide what action should be taken. Some mothers who had a source of income said they could decide by themselves to seek the treatment, although they would consult with their husbands or in-laws to maintain harmony in the family.

Health Care Options and Use

The existing health facilities in the study *Ilakas* include government health posts, private clinics, and local faith healers. The responses from both the in-depth interviews and focus group discussions indicated that most mothers preferred to use the private clinics because of proximity, availability of the health care providers at all times, better quality care, and greater variety of medications available (Table 3.12).

The reasons stated for not using the government health posts were that they were far away, lacked medicines, and gave the same medicine for all ailments and that their staff members behaved rudely. Most mothers mentioned that they had to buy medicines from a private medical store whenever they visited the health post. Most mothers used the government health facilities only for immunizations.

Mothers tended to have confidence in the local private practitioners and did not often consult alternative health care providers. Some respondents said that local faith healers are the first to be consulted, especially if the child suffers from a bad spirit, and private practitioners are consulted only when the first line of treatment fails to be effective.

Most health care providers said that the uneducated mothers usually go first to the *dhami* (faith healer) and then the health post and only in very extreme cases people did people come first to the health post. Some health care providers said that mothers used the health posts when they were more convenient and agreed that mothers preferred to go to a private clinic.

Table 3.12. Use of different health care options

	Nepali speaking	Maithili speaking	Tharu speaking
Preferred health care provide			
Private clinic	++	++++	+++
Health post	++		+
Local faith healer			
Alternative facility			
Ilaka health post	+	++++	+++
District hospital	+	++	+++
Local faith healer	+	+	+
Reason for using private clinics			
Nearest	++	+++	+++
Good medicine	+	+++	+
Treated well		+	+
Always available	+		
Why don't use health post			
Distance	+++	++	++++
Bad or spoiled medicine			
Same medicine for everything			
Medicine not always available			
Why use alternative options			
First method does not help immediately	+	++++	++++
Referred by the doctors	+++		
Use different option for same disease			
Yes	+		++
No	+++	++++	++
Why use different option			
Don't believe in only one	++		
Tradition (*Dhami*)	+		+++
Anxious and want quick recovery	+		
Why don't use different option			
Afraid of drug interactions	+		
Do not know	+++		

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

Potential Source of Iron Supplements

All participants were confident that the female community health volunteers would be the best providers of iron supplements. These local volunteers were trusted because they were familiar with all the children below age 5 years in the area. Mothers had more confidence and trust in these volunteers than in the health workers at the health posts.

Child Feeding Practices

Breast-feeding was universal and most mothers stated that they breast-fed their child (Table 3.13). Most mothers claimed that they fed colostrum to their newborn, although none of the mothers knew the benefits of doing so. Feeding cow or goat milk, milk from other lactating mothers, or glucose water to an infant during the first few days after birth was a common practice.

Most mothers believed a baby should be exclusively breast-fed for 5–6 months, but most of them did not do this because of a variety of constraints. Also, when mothers stated that they exclusively breast-fed their infant, on probing it became clear that many were also giving glucose water or cow, goat, or buffalo milk, which they do not consider to be extra food. Some mothers continued to exclusively breast-feed beyond age 6 months, but others introduced foods, such as rice or wheat *lito,* earlier at 2–3 months of age if the mother thought she did not have sufficient breast milk. Most mothers continued to partially breast-feed their child as long they had milk or until the birth of the next child.

Breast milk continued to be the main source of nutrients besides cow milk, goat milk, glucose water, tea, and biscuits until children were able to feed themselves. Some of the mothers did not try to feed solid food to a child as long as breast milk was considered adequate. Across all three groups, most mothers thought that complementary feeding should occur sometime between 6 and 12 months. Most mothers said that solid food is introduced between 6 and 12 months. When they were asked when the family

Table 3.13. Child feeding practices[a]

	Nepali speaking	Maithili speaking	Tharu speaking
Exclusively breast-feed			
Up to 6 months	++	+++	++
Up to 12 months	+	+	+
Up to 24 months	+		
Breast milk substitute			
Cow milk	+++	++	++
Goat milk		+	+
Buffalo milk	+		
Glucose water	+	+	
Introduce solid food			
Between 6 and 12 months	+++	++	+++
After 12 months	+	+	+
Age to get family food			
12 months	++	+	+
24 months	+	++	+++
Type of solid food given			
Lito	++	++	+
Jaulo	+	+	++
Rice with lentils	+++	+++	+++
Biscuit	+	+	++
Person who feeds			
Grandparent	+	++	++
Father			
Mother	++	++	++
Cooks food each meal time			
Yes			
No	++++	++++	++++
Frequency of feeding			
On demand	+		
2 times/day (morning and evening)		+	+
Not fixed	+	+++	++
Feeding method			
Hand	++	++++	++++
Spoon	++		

[a]n=10 for all groups. + indicates 2–3 responses, ++ indicates 4–5 responses, +++ indicates 6–7 responses, ++++ indicates 8+ responses; 1 response was considered insignificant and was not included in the table.

food is given to the children on a regular basis, some Nepali and Maithili mothers said they give solid food at age 12 months whereas most of the Tharu mothers said they give solid food at age 24 months. Most mothers said they give rice and lentils as solid food to the children. Some mothers also said they give *lito* and *jaulo* (boiled rice with turmeric and little bit of ghee or oil).

Mothers usually fed their children but children were also fed by grandparents. Among Nepali speakers, sometimes fathers (fewer than one-fifth, and it was not considered significant) also participated in feeding their children after they started walking. In most homes a child was given a separate plate of food. Mothers considered that plate sharing by children was not a good practice because it created uncertainty about the food intake of the younger children. Although mothers considered stale food to be unhygienic, they did not prepare fresh food for each meal because of the lack of time

There was no fixed frequency of feeding, and the few mothers who responded to this question stated that they fed their child twice per day. For children older than 24 months it is difficult to know the frequency of feeding because children start to eat by themselves. Semisolid and solid foods were fed by hand rather than with a spoon.

Discussion

A general but vague understanding was discernible among mothers and child caretakers regarding the importance of blood to health and dietary factors that cause anemia. Health care providers had similar but better-grounded perceptions than did mothers regarding blood and its re-

lation to health. As a group, mothers saw no specific association between iron and anemia. Mothers were not aware that iron is an important nutrient for preventing and treating anemia. Perceptions about foods that help to prevent and treat anemia were generally positive, although these were of a general nature and not specific to iron deficiency anemia.

When mothers of all three groups were asked whether anemia can be prevented, most said yes—with food. A few Nepali- and Maithili-speaking mothers mentioned that supplements could prevent anemia. In contrast, health care providers said that iron supplements are only for treatment of anemia, not for prevention. These findings show the need for health education for both mothers and health workers to enhance understanding of anemia, its effects on child health, and its prevention. Such messages could build on concepts that mothers and health workers already understand, for instance, the strong link seen among food, blood, and health. The negative misconceptions of health workers about women's attitudes, beliefs, and practices also need to be addressed.

Mothers identified a liquid iron supplement with a sweet and fruity taste as being most appropriate for young children, and most preferred the supplement to be given daily and by the female community health volunteers. An iron supplementation program could address the high prevalence of childhood anemia in Nepal, but household trials would need to be done first to identify the most acceptable form of supplement and long-term adherence. Within this, the use of an iron supplement that can be mixed with complementary food (sprinkles) may be a viable option and should be explored further, particularly in relation to child feeding practices. For example, there were some differences among the three groups in who fed children, and the effect of this on the use of sprinkles would need to be assessed. Also, efficacy of the sprinkles used with precooked food would have to be examined. The overall quality and variety of complementary food fed to children, however, needs to be improved within the context of the foods that households use and their available resources, because the predisposing factor to infantile anemia undoubtedly is an inadequate intake of dietary iron. The early introduction of complementary foods at around age 2–3 months and also the delayed introduction of complementary food until age 12–18 months reported by some mothers also need to be addressed. More effort is needed to develop appropriate behavior-change strategies and tools, based on good formative research, to improve practices with infants and young children that will both improve micronutrient and overall nutrition status.

In terms of distribution of supplements, distance, attitude of the public sector health care providers, attractiveness of the medicines, affordability, and ability to buy health care on credit determine which health facility is used. Nevertheless, mothers' lack of confidence in the government health service means that any program dependent only on this as the delivery system for supplements is likely not to research target groups. All study participants identified the family community health volunteers as a reliable and helpful source of health care and thought that they should be entrusted with the task of delivering iron supplements. The effectiveness of the family community health volunteers for supplement distribution needs to be assessed. Because of mothers' acceptance of the local medical practitioners as good providers of health care, involving local practitioners in an iron supplementation program will be important.

Most mothers said the child's father makes the decision in seeking health care services when a child is sick. Grandparents also influence the decision-making process. The severity of the illness determines whether a mother can seek health care services. When a child is seriously ill, mothers do not wait to ask other family members whether to seek health care. For a simple illness a mother consults with other family members and neighbors.

To conclude, before an iron supplementation program can be started, operative research is needed to identify the best iron delivery system, and materials related to behavior changes directed at both health care providers and the community at large regarding anemia and its control will have to be developed.

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4: FINDINGS OF THE PERU COUNTRY STUDY

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Background

Peru was selected as the Latin American country to be studied. It is a country with distinct ecologic areas: a coastal desert plain, sierran highlands, and a jungle area. Although traditionally a rural population, because of migration in recent decades, around 75% of the population now lives in urban areas. Approximately 7 of the 24 million inhabitants of Peru reside in the capital city, Lima; 70% reside in the shanty towns or periurban areas surrounding the city. There are high rates of unemployment (9%) and underemployment (42%) (Instituto Nacional de Estadística e Informática 1998). The mean income for those receiving a daily wage in Lima is around US$10 per day. Nevertheless an estimated 40% of the population of Lima lives in poverty and 5% in extreme poverty (Cuanto 1998). Except for the more remote rural areas that are mostly in the highlands and the jungle, access to health care is relatively good.

Prevalence of Anemia in Children

The 1996 national demographic and health survey, which included hemoglobin measurements, found that the prevalence of anemia (hemoglobin [Hb] <110 g/L) among children between ages 6 and 23 months was 77%; 50% of the anemic children were moderately (Hb <100 g/L) or severely anemic (Hb <70 g/L) (Ministerio de Salud et al. 1998). In this age group and for all children aged 6–59 months, the prevalence of anemia did not vary by geographic region, showing that anemia is a public health problem throughout the country

The principal cause of anemia in Peru is inadequate iron intake. A survey of iron intakes of preschool children in a rural sierran community found that intakes supplied 10% of requirements of infants aged 6–12 months and 53% of requirements of children aged 12–24 months. The adequacy of iron intakes for infants younger than 1 year was much less than the recommended daily intakes for non-breast-milk iron (FAO and WHO 1988) where the bioavailability of dietary iron is classified as medium (Lopez de Romaña et al. 1998). Only 8% of iron intake was from animal sources, suggesting that little highly bioavailable iron was consumed. A recent study of 24-hour recall intakes conducted for 3 days found that children aged 6–8 months received 11% of the recommended daily intake of iron from non-breast-milk sources whereas those aged 9–11 months received 22% and those aged 12–25 months received 56% (Brown et al. 1997). Iron from meat, poultry, and fish sources represented only 14% of the total iron intake.

Anemia Control Policies and Programs

The current Ministry of Health policy is to supplement infants aged 6–24 months with a preventive dose of elemental iron of 1 mg/kg/day, most commonly prescribed as ferrous sulfate. However, free iron supplements for children are not available and iron is still not routinely prescribed. A recent initiative of the Basic Health and Nutrition Project of the Ministry of Health, financed by the World Bank, is starting an iron supplementation program with ferrous fumarate through the peripheral health services in five periurban and rural areas. The target age group is children aged 6–24 months.

Review of Relevant Ethnographic and Qualitative Studies

Information on sociocultural factors that may influence iron supplement use is available from previous studies in Peru. Two studies explored the perceptions of women and adolescent girls about anemia as related to themselves and during pregnancy (Creed-Kanashiro et al. 1998, Zavaleta 1996). The results showed that many adult women reported knowing about anemia and almost one-half of the population surveyed said they had been diagnosed as anemic, mostly during pregnancy. The high prevalence of anemia in adult women was recognized. Women said that poor eating habits including inadequate food intakes, a poor-quality diet, and not eating regular meals were the primary causes of anemia. They also commented that inadequate food intake leading to anemia could be the result of poor nutrition in childhood or at the present time. The secondary causes of anemia were blood loss during

menstruation or at the time of giving birth, excess work, parasites, a lack of iron or vitamins in the diet, and drinking lemonade. All of the above, however, needed to be accompanied by poor nutrition for anemia to develop.

Treatment for anemia in adults can be natural or clinical. The former was considered superior to the latter and included eating better, both in terms if the quantity and the quality of the diet, and eating good food (rich in vitamins), certain food recognized as good for treating anemia (e.g., spleen, liver, spinach, and beetroot—red in color, thus like blood), and fruit extracts. Drinking more liquids in general was considered good for reducing anemia because they can be transformed into blood. Clinical treatment included taking vitamins or iron. Blood transfusions were mentioned only for advanced or serious anemia.

Two studies looked at health-seeking processes and may provide information about factors that may influence iron supplement use or treatment for anemia (McMichael 1997, Paredes et al. 1992). Both studies documented that the health-seeking process takes place within a context of medical pluralism, where home treatment is preferred until a worsening of symptoms shows that more assistance is needed. At that point, pharmacists, medical doctors, or traditional healers may be consulted. The process is dynamic: options are tried and, if considered unsuccessful, a new treatment is used. As treatments fail and symptoms change, diagnosis is also modified. A recent study on sociocultural aspects of tuberculosis in Lima and Cusco showed the same basic pattern for tuberculosis sufferers (Yeager et al. 1998). Studies conducted in the Peruvian Andes also showed this pattern of health-seeking behavior for a variety of diseases (Yeager et al. 1993, Hahold 1988, Kroeger 1988). However, in these studies—unlike those conducted in urban areas—the large distance to the nearest formal health facility limited their access for the general population.

In terms of vitamin use, a recent study in a periurban area of a coastal city found that 25% of mothers with children below age 3 years had given their child vitamins; vitamins had been prescribed for 85% of these mothers (M. Penny and H. Creed, unpublished, 1998). Specific details such as the type, duration, and amount of the supplement given were not explored in this survey; thus, it is unknown whether the supplement contained iron.

Study Setting

This study was carried out in Pamplona Alta, a shanty town to the south of Lima with various degrees of urban development. The area can be divided generally into a low zone and a high zone. The low zone is more urbanized than the high zone and has predominantly brick housing. Water and electricity are more continuously supplied and paved roads occur more than in the high zone. Settlement began in this part of Pamplona in the late 1960s, when large numbers of Andean migrants came to Lima in search of better jobs, housing, and education.

The high zone is characterized by more recent squatter settlements, some of which have basic water and sanitation services. Even where piped water is available, water supply is irregular and available on average three times per week. Most homes have access to electricity. Housing material varies greatly and ranges from brick to precarious structures of straw matting or cardboard. All but the main access roads are unpaved. This part of Pamplona is occupied by people who fled the terrorist violence of the 1980s and early 1990s and by those who were looking for better economic prospects during the years of the acute economic crisis. This zone also includes families of the children of the initial settlers in the low zone who built their own homes in the high zone

Pamplona Alta is within the catchment area of the Ministry of Health maternal and child hospital, located in the low zone. The low zone also has several small Ministry of Health posts and one small health center operated by the Catholic Church. There are no Ministry of Health facilities in the high zone, and the bus ride to the maternal and child hospital takes about 30 minutes.

Research Methods

The methods described in Chapter 1 were followed and, in addition, a quantitative survey and a small-scale household iron supplementation trial were conducted. For the quantitative survey, structured questionnaires were completed to complement the conclusions from the qualitative study and to check their applicability to a larger, randomly selected, representative population. The survey was designed on the basis of the findings from the in-depth and key informant interviews (Appendix 2).

The quantitative survey included 100 households with children aged 6–24 months. An equal number of households was included in the high and the low zones. For purposes of sample selection, each zone was divided into five areas roughly equal in size. In each area, field workers randomly selected a block to start at. Houses were visited, door by door, with the worker going in the same direction each time until 10 surveys per area were completed.

While carrying out the survey, field workers also visited every pharmacy they came across and used a structured guide to ask questions about the iron supplements available. Information was obtained from the six pharmacies in Pamplona, all of which were located in the low zone. No pharmacies or drug shops were found in the high zone.

Because the administration of a medicine or vitamin-mineral supplement to small children is often quite difficult and because few mothers had given their children

iron supplements, collecting information about mothers' problems and concerns with supplementation was important. Thus, a small iron supplement trial was conducted. Because of time constraints, only six women who had been interviewed in depth and who were not administering iron supplements to their child were invited to participate. Initially, two age groups (6–15 and 15–24 months) were going to be used, but during the interview process a cutoff at 12 months was deemed more in line with mothers' perceptions of child development, so this was used. Three mothers whose youngest child was aged 6–11 months and three mothers whose youngest child was aged 12–24 months were selected. Three of the mothers came from the high zone and three from the low zone.

After written informed consent was obtained from the mothers, they were given the choice of several locally manufactured iron supplements: three were drops and one was a syrup. The children were weighed and the dose of elemental iron was calculated as 1 mg/kg body weight. Mothers were instructed to administer the supplement 1 hour before or after meals, and the time was discussed with the mother. A field worker visited the home daily for the first 3 days and every other day for the next 2 weeks. During the visits, adherence, perceived difficulties, and problems were noted as well as preferences for the time of day (in relation to mealtimes) that the supplement was given, side effects, comments on the child's acceptance, and reactions of the mother and other family members.

The quantitative data were analyzed by using SPSS version 7.5. When appropriate, comparisons between the high and low zones were done because of the difference in socioeconomic conditions in the two areas. Because the data were mostly categorical or dichotomous, nonparametric statistical tests were used.

The research was approved by the ethics committee for research in human subjects at the Instituto de Investigación Nutritional.

Results

This section describes the findings from the in-depth qualitative interviews and the quantitative survey. For the most part, findings from the in-depth interviews, key informant interviews, focus groups, and survey converged; comments are made where this is not the case. For most topics a table is presented with the relative weights of specific responses from the in-depth interviews (as described in the overall methods section) and where appropriate the percentages of the survey are presented as well. The findings from the interviews with the pharmacists and the iron supplement trial are presented at the end of this section.

Among the 100 mothers with children aged 6–24 months included in the quantitative survey, 29 had children were below age 12 months. Overall, the age of mothers was 27 ± 6.6 years (mean ± standard deviation), 85% were married, and 27% reported working part or full time outside the home. There were no high-low zone differences for the above characteristics but, as expected, mothers' education level differed significantly between the zones. In the low zone 85% of the mothers had completed at least secondary school compared with 20% in the high zone ($P<0.05$). Similarly, 77% of fathers in the high zone had completed at least secondary school compared with 53% in the low zone ($P<0.05$). These differences reflect the contrasting socioeconomic characteristics of the two zones as do the differences found in housing materials, basic services, or both (Table 4.1).

Table 4.1. Household characteristics (survey data)

	High zone (n=50) (%)	Low zone (n=50) (%)
Cement walls[a]	42	78
Cement floor[a]	54	88
Piped water	74	78
Sewage[a]	64	98
Latrine	22	3
Electricity	96	100

[a] $P < 0.001$.

When families initially settle into an area, houses are usually constructed of precarious materials such as straw matting or cardboard. Once families are sure they are likely to stay, they begin to invest in bricks for building the walls of the home. The next step in the construction process is to finish the walls with cement and lay a cement floor. The speed with which house construction advances depends on the family's resources. This and the fact that the low zone is an older area explain the zonal differences in housing characteristics. Although most of the households in both the low and high zones have piped water, which is a priority of the present government, there is not enough water for all Lima; thus, water is available only two or three times per week at best and less frequently during the summer months.

Perceptions of Health

Any discussion of child health in Peru must take into account the local medical culture that is heavily influenced by the idea of maintaining an equilibrium between cold and hot in the body (Hahold 1988). Exposure to an excess of either, be it internal or external, results in illness. Internally, overconsumption of foods or beverages considered hot or cold or abnormal emotional states attributed to these characteristics may cause disease. Likewise, prolonged exposure to the sun or to the cold may result in sickness. As such, the health culture is heavily oriented toward curative rather than preventive medicine. Prevention im-

plies attempting to maintain a balance between hot and cold in the body.

Although basic humoral concepts influence perceptions about the etiology and treatment of illness, they seldom affect decisions regarding food preparation and diet. This also applies to the choice of complementary foods given to young children, although foods considered good because they are nutritious, such as selected animal products or yellow foods (e.g., squash, carrot, and yellow banana), may also be humorally neutral or hot. Similarly, specific foods may not be given during winter because they are considered too cold (e.g., citrus fruits). However, mothers do not plan meals trying to balance cold and hot food.

In this study the description of a healthy child fell into two categories: physical appearance and behavior. A healthy child was described as one who eats well or has a good appetite; is chubby, rosy-cheeked, and active; and who allows his mother to get the housework done (Table 4.2). An unhealthy child was described as basically the opposite: a child who does not eat well, and is therefore skinny and weak. Such a child was not active, was irritable, and cried a lot.

The responses mothers gave as factors that can affect child health can be grouped into nutrition, external factors, and care. The most important factor for providing good health for a child was adequate nutrition and good feeding practices (Table 4.2). Under child care, three issues were identified: good hygiene, good maternal care, and timely medical attention. The descriptions of the first two were vague and subjective. Good hygiene embraced both personal hygiene and the overall order of the home. Maternal care seemed to refer to the amount and quality of attention a mother gives to her child. Appropriate feeding practices and good nutrition were considered much more important for providing good health than were good hygiene and maternal care, although these were also mentioned, yet poor hygiene and inadequate maternal care were mentioned more frequently as causes of illness in children of other families in the community.

External factors, such as the climate, precarious living conditions, and *susto*, were more important than child care in explaining sickness. This study was carried out between June and August, when the mean daily temperature is around 14 °C and the humidity is between 80% and 90%; thus, it can be quite cold and damp. The houses are not heated and mothers attribute children's frequent respiratory infections to the cold weather. The precarious conditions of many houses in this area, which have little protection against the cold and dampness, were also mentioned as detrimental to a child's health.

Susto is a well-documented folk illness common to many parts of Latin America. In Peru it is thought to be caused by a fall or because a hill or mountain grabs the child. In Pamplona the women who lived on the hill said that because it had been uninhabited before they settled there, the hill was particularly strong; thus, they were particularly susceptible to *susto*. *Susto* may result in a range of symptoms including general malaise, diarrhea, vomiting, and fever. A child with *susto* was said to have eyelashes that stand on end.

Association between Food and Health

For mothers and the family in general, nutrition and food played a central role in the health of the child (Table 4.3). Good nutrition was said to be necessary for a child to grow well and have good defenses (*buenas defensas*). The phrase *buenas defensas* appeared to be derived from

Table 4.2. Child health issues (in-depth interviews)[a]

	Low zone	High zone	Overall
Description of a healthy child			
Eats well and has good appetite	+++	+++	+++
Is chubby	++	+	+
Has rosy cheeks	+	+	+
Plays	+++	+	++
Is calm	+++	+	++
Is happy	+	+	+
Sleeps well	+	0	+
Factors that promote health			
Food and feeding	+++	+++	+++
Good childcare practices	++	+	+
Hygiene	++	+	+
Factors that cause bad health			
Food and poor feeding	+++	+++	+++
Cold and dampness	++	+	+
Dirtiness and dust	+	+++	++
Falls and *susto*	++	+++	++
Poor childcare	+	+	+

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses.

Table 4.3. Association between food and health (in-depth interviews)[a]

	Low zone	High zone	Overall
Association exists	+++	+++	+++
How			
For growth	+	++	+
To have good defenses	+++	+++	+++
Good foods			
Animal	+++	+++	+++
Plant	+++	+++	+++
All foods	+++	+++	+++
Specific foods	0	0	0
Bad foods			
Fatty foods	+	0	+
None	+++	+++	+++
Illness related to lack of specific food	0	0	0

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses.

biomedical terminology related to the immune system, which is consistent with other studies (Yeager et al. 1998), although here it alluded more to the general strength of the child to protection from disease.

Food was considered essential not only for the health of the child but for the health of all age groups. Good food was said to be important for maintaining good health, and good food meant natural foods and a balanced diet. Mothers said people should eat a little of everything (meats, pulses, fruits, vegetables in soups, and main dishes). Eating at the appropriate times and not skipping meals was important.

Association between Food and Blood

Asking mothers about the blood of their children elicited reactions ranging from perplexed looks to laughter and was definitely not an issue that came up in conversation. However, after probing, most mothers thought some relationship must exist. Because good food and nutrition were important for health in general, they were also thought to be important for good blood. No single food was thought to be exceptionally good for blood, with a few exceptions such as beetroot (because of its color) and chicken liver. This was also found in the quantitative survey where, although 68% of mothers said there are foods that are good for the blood, 52% of these respondents said either all foods were good or identified foods they considered good in general for children, such as milk, cereals, meat, vegetables, etc. Beetroot was specifically mentioned by 19% of these mothers, and 15% mentioned foods rich in iron, such as chicken liver and spinach, included in Table 4.4 under animal and plant foods.

In the qualitative study, foods considered bad for children's health, such as fatty foods and sweets, were also mentioned as being bad for blood (Table 4.4). In the quantitative survey about 40% of mothers said foods ex-

Table 4.4. Association between food and blood

	In-depth interviews[a]			Survey (%)		
	Low zone	High zone	Overall	Low zone (n=50)	High zone (n=50)	Overall (n=100)
Association exists	+++	+++	+++	na	na	na
How						
If well fed, blood healthy	+	+	+	na	na	na
Food increases blood	0	+	+	na	na	na
Good foods						
Animal	++	++	++	14	6	10
Plant	++	++	++	14	14	14
All foods	+++	+++	+++	38	32	35
Liquids	+	+	+	6	8	7
Bad foods						
Fatty or fried foods	++	++	++	0	2	1
Sweets	++	0	+	32	28	30
Salt	+	0	+	0	4	2
Others	0	0	0	14	2	8

[a] n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses, na indicates not asked. The mothers interviewed found it difficult to verbalize how food and blood and health and blood were related.

Table 4.5. Association between blood and health (in-depth interviews)[a]

	Low zone	High zone	Overall
Association exists	+++	+++	+++
How			
If healthy, blood healthy	+++	+++	+++
Color			
Good: red	+++	+++	+++
Bad			
Pink/orange	+	+	+
Orange	+	+	+
Consistency			
Good, not too thick	+	+	+
Bad, thin	++	++	++
Amount: bad, low	++	+	+
Other characteristics			
Good, clean	+	0	+
Bad, dirty	+	0	+

[a] n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses. Questions regarding characteristics of blood were not direct questions; most women referred to healthy blood and not to bad blood.

isted that are harmful to blood, and of these mothers, 73% mentioned sweets. Responses in both zones were similar. In contrast to the qualitative data, salt and fatty foods were infrequently mentioned.

In summary, the health of young children was strongly linked to appropriate feeding. By definition, a well-fed child was a healthy child. Conversely, a thin, poorly fed child was most likely to get ill. Mothers said the condition of blood may also reflect the health status of a child but, because blood was not readily visible, it was not foremost in their minds.

Association between Blood and Health

After some probing most mothers said that the blood of a sick child is probably different from the blood of a healthy child. The blood of a healthy child would be thick and red whereas that of a sick child would be thin and pink (Table 4.5). Some mothers suggested that, in general, a child's blood is healthier than an adult's blood; a child's blood is purer because adults have been exposed to illness and, therefore, their blood is less healthy.

When asked directly if there was any illness that affected a child's blood, two of five mothers (n=39) in the quantitative survey responded positively, with more mothers in the low zone than the high zone (54% vs. 28%) showing greater awareness about this. The illnesses reported to affect a child's blood are listed in Table 4.6. Of the mothers who had heard of any illness affecting a child's blood, one-half recognized anemia. The responses in both zones were similar.

Whatever disease was named, 51% of mothers attributed the cause to poor diet or nutrition and a lack of food. Of the 21% of mothers who mentioned anemia, 33% said it was due to a lack of food, 43% said that it was due to poor nutrition, and 10% said that it was due to a lack of iron. Two mothers gave causes related to nutrition: one said that anemia was due to excessive consumption of sugar and the other to a lack of protein. A third mother said anemia was caused by the child being given too many medicines.

Sixty-three mothers said that something could be done to improve a child's blood (Table 4.7), of whom 78% mentioned good nutrition. In general the responses were similar those described when mothers were asked what needed to be done to maintain a child's health.

Table 4.6. Diseases associated with children's blood (survey data)

Age group	High zone (n=50) (%)	Low zone (n=50) (%)	Overall (n=100) (%)
Anemia	12	30	21
Acquired immune deficiency disease	2	14	8
Cancer, leukemia	4	8	6
Diabetes	6	2	4
Stomach infection	2	0	1
Tuberculosis	2	0	1
None	38	20	29
Do not know	34	26	30
Total	100	100	100

Signs and Symptoms of Anemia

In this population the term anemia was well known (95% of mothers in the quantitative survey knew the term). From the in-depth interviews and focus groups, anemia seemed to be more associated with adults particularly but not only with women. Most women had experienced anemia during pregnancy or were at least aware of the possibility of becoming anemic during pregnancy. Anemia in young children was not thought to be common, especially among

Table 4.7. Measures that could be taken to improve a child's blood (survey data)

Age group	High zone (n=50) (%)	Low zone (n=50) (%)	Overall (n=100) (%)
Good nutrition	48	50	49
Give vitamins	4	6	5
Prompt medical attention	8	0	4
Limit sweets	2	2	2
Good hygiene	0	4	2
Keep to child's feeding schedule	2	0	1
Did not know	30	34	32
Nothing (can be done)	6	4	5
Total	100	100	100

breast-fed children. Some mothers said that it was not possible to know whether a child is anemic until the child is of school age.

Health care providers also thought that anemia was infrequent in small children and commented that they only occasionally saw cases. From the descriptions for the latter, these seemed to be cases of severe anemia. Health care providers were unaware that the extent of the problem in Peru was both known and documented. Nurses and physicians said that requesting routine blood tests was not common, although stool tests were frequently done to check for parasites. In the quantitative survey, 22% of mothers reported having had blood tests done on their child to check for anemia.

The reported signs and symptoms of anemia in children can be grouped into three categories: physical appearance, general attitude, and physical growth (Table 4.8). For physical appearance the most commonly recognized symptom was a pale face and, to a much lesser degree, a pale lower eyelid. This paleness may also be extended to the rest of the body. Pale palms or tongue were not associated with anemia nor was a puffy face.

In terms of general attitude, children with anemia suffered from malaise and were lethargic and not interested in playing. In general, anemic children are "just not the same." Anemic children were also identified as those who lose their appetite and lose weight. Some mothers said these children did not grow and develop properly.

Mothers reported that anemia may cause headaches, dizziness, fatigue, and poor school performance for older children and adults. Some mothers suggested that perhaps smaller children also experienced some of these symptoms but were unable to express them. None of the symptoms of anemia were seen as requiring immediate attention.

Eating earth or pica was not associated directly with anemia but was associated with parasite infection when weight loss was also a symptom. In general, both mothers and health care providers did worry about parasites and they reported a high prevalence of parasite infection in the community.

In the quantitative survey 87% of mothers said that everyone was susceptible to anemia; after probing, most specified that children under age 5 years were susceptible (Table 4.9). When asked directly if children aged 6–24 months could get anemia, 85% of mothers responded positively.

The principal cause of anemia for all ages was poor diet (Table 4.10), which related more to dietary quality than quantity. Not eating well referred to eating too much starch or sweets and not enough vegetables, fruits, milk, meat, eggs, liver, or other foods considered nutritious. Some mothers specifically said that anemia was due a lack of vitamins, suggesting the absence of nutritious foods. This was also found in the quantitative survey, where 67% of the respondents stated that a lack of vitamins or food or a poor diet caused anemia. As stated in the section about blood and health, of the 21 mothers who spontaneously mentioned anemia as an illness affecting the blood of children (Table 4.6), only 2 had said that the anemia was due to iron deficiency.

Health care providers had views similar to those of mothers about the cause of anemia. Their definition of not eating well, however, included a lack of iron in the diet. This definition did not refer to the child's lack of appetite, but to feeding an inadequate quantity or quality of food to the child. Because children are not responsible for what

Table 4.8. Signs and symptoms of anemia

	In-depth interviews[a]			Survey (%)		
	Low zone	High zone	Overall	Low zone (n=50)	High zone (n=50)	Overall (n=100)
Paleness	+++	+++	+++	40	32	36
Inactive/lethargic	+	++	+	20	18	20
Loss of appetite	+	++	+	28	26	27
Weight loss	+	++	+	0	0	0
Doesn't grow	+	0	+	0	2	1

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses.

Table 4.9. People who can get anemia (survey data)

	Spontaneous (n=100) (%)	Mentioned when asked (n=100) (%)	Cannot get anemia (n=100) (%)
Adults	7	89	4
Men	1	89	9
Women	7	93	0
Babies	5	93	2
Children	20	80	0
Children <5 years	1	95	4
Children >5 years	4	94	2
Everyone	69	18	13

Table 4.10. Causes of anemia

	In-depth interviews[a]			Survey (%)		
	Low zone	High zone	Overall	Low zone (n=50)	High zone (n=50)	Overall (n=100)
Poor diet or lack of good food	+++	+++	+++	62	68	67
Mother anemic, gives child through breast milk	+	+	+	5	10	7
Mother anemic, gives child during pregnancy	++	+	+	0	0	0
Parasites or other illnesses	+	0	+	0	0	0
Low defenses	0	0	0	2	12	7
Blood loss when umbilical cord cut at birth	0	0	0	2	0	1
Infected	0	0	0	0	2	1

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses.

they are fed, the blame for anemia was largely placed on the mother. Although a poor diet was mostly explained by the economic situation of the family, sometimes it may also have stemmed from inadequate child care. Mothers may not have offered foods appropriate for the child; they may have offered only adult foods, only infusions, or too many sweet foods. Mothers may also have offered foods outside a child's normal feeding schedule, which is thought to diminish the nutritional value of the food because it is less assimilated by the body.

Another possible cause of anemia reported, especially in infants, was transmission from the womb or through breast milk (Table 4.10). This was caused by poor maternal nutrition, where the mother has not eaten well and passed the effects of poor eating to her child. It is believed that during pregnancy the mother eats for both the child and herself; if she does not eat well, the fetus does not get nourishment. Likewise, a mother who breast-feeds must eat well and if she does not, her milk is not as nourishing as it should be. Instead, it is thin and watery and the mother herself becomes debilitated and may pass the anemia to her child.

Anemia was perceived to be a moderate illness because it stems from something that can usually be controlled (i.e., food and diet). In some households the type and amount of food eaten cannot be controlled, for example, where the family is extremely poor, but in most households in this population, the foods consumed depend on selection by the mother and good foods are accessible to most. Thus, because the prevention of anemia is considered controllable to a certain degree, carelessness too was reported as a factor determining the progression of anemia. Some mothers said various degrees of anemia existed, starting with a mild state and eventually reaching a chronic state. For other mothers, weakness was the beginning of anemia, with tuberculosis and eventually death being the most severe form. An anemic person who did not eat well, was poorly fed, did not see a physician, or did not follow a physician's advice could become chronically or severely anemic.

Treatment and Prevention of Anemia

An inverse association was perceived between diet and anemia—that is, anemia was the consequence of a poor diet and with a good diet there was no anemia—thus food causes, cures, and prevents anemia. Because poor nutrition causes anemia, the best treatment is to improve the diet (Table 4.11). This improvement can come from increas-

Table 4.11. Treatment and prevention of anemia

	In-depth interviews*			Survey (%)		
	Low zone	High zone	Overall	Low zone (n=50)	High zone (n=50)	Overall (n=100)
Treatment of anemia						
Food	+++	+++	+++	72	60	66
Vitamins	+++	+++	+++	22	12	17
Medicines	+	+	+	0	10	5
Transfusions	++	+	+	0	2	1
Intravenous solution	+	+	+	0	0	0
Fortified foods	+	0	+	0	0	0
Prevention of anemia						
Food	+++	+++	+++	88	82	85
Vitamins	++	++	++	12	2	7
Medicines	0	0	0	0	2	1
Transfusions	+	0	+	0	2	1
Fortified foods	0	0	0	0	0	0

*n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses.

ing the quantity or consumption of specific foods, including meat, chicken liver, spleen, fish, chicken, vegetables such as artichoke and beetroot, and fruits. A few mothers also mentioned special foods such as frog, pigeon blood, or fish concentrate with green apples.

There was also a strong perception that for anemia to be cured, a child must be taken to a physician so that appropriate vitamins can be prescribed. Both mothers and health care providers said that vitamins would stimulate the child's appetite and, therefore, this treatment has to be accompanied by an improved diet. Respondents said it was important that the vitamins were prescribed by a physician because they are chemicals that can be harmful to children. In the quantitative survey, when asked what the treatment for anemia was, 66% of respondents mentioned food and 17% mentioned vitamins (Table 4.11). The responses were similar in both zones. The apparent difference between the response for vitamins between the qualitative and quantitative studies can be explained by the fact that the quantitative survey only allowed for one treatment option. Mothers did not know of specific medicines for anemia other than vitamins, nor were they familiar with the term supplement. They also thought transfusions or injections would be inappropriate for anemia, especially in small children, although they did recognize that they were treatment options for severe cases of anemia.

Many mothers reported receiving fortified foods through food aid programs, such as the Glass of Milk program, which supplies powdered milk and a cereal alternating with a fortified cereal-based instant drink preparation to young children. These foods were not associated with anemia prevention.

Attitudes toward Iron Supplementation

Both the qualitative and quantitative studies found that good nutrition was considered the means for preventing anemia. Although vitamins could help to increase a child's appetite, food was more important. Health care providers shared this perspective. They complained that mothers frequently came to them looking for vitamins for their children but, for them, the best vitamin is the "vitamin P for pot." Health care providers said they would prefer mothers to invest more in improving the diet (i.e., increasing the quantity and the quality by including more animal products and beans) than in buying vitamins. Furthermore, they thought that mothers would either not buy the vitamins or not administer them for an appropriate time, so that prescribing anything was useless. The health care providers said their own time was better spent on promoting appropriate feeding.

In general, mothers had a favorable opinion of vitamins. They were seen as reinforcement rather than as a way to strengthen defenses. Although nutritious foods were more highly valued than vitamins, mothers allowed for the possibility that a child might sometimes need an additional source of vitamins. Some mothers said that although children may look all right, they may be missing something. They also said some might have "false fat" whereas others may be thin because of their stature. They thought it was the physician's task to examine the child and decide whether the child needed something extra. Another concept favoring the use of vitamins was that a nutrition deficit in children may not become apparent until the children are in school when, because of a poor diet as a baby, they may fall asleep or not do as well as other children.

Because of the importance that mothers attached to food and feeding, the finding that mothers become very concerned when children lose their appetite was expected. If they found themselves in this situation, mothers would

be eager to use vitamins as appetite stimulants. In the quantitative survey, the two frequent responses to the question about when a child should take vitamins were when the child shows symptoms of illness (34%), especially a lack of appetite, and when the child is thin or weak (32%). A third frequent response was "always" (17%).

Issues existed to discourage the use of vitamins. For example, mothers said that although they may sometimes be helpful, vitamins were still chemicals that may be harmful to the child, especially when an inadequate product or dose is given. Mothers generally thought that a natural solution for controlling anemia was better. This was also influenced by the economic situation of the family. Because vitamins needed to be purchased, most mothers felt that their money would be better spent improving the diet of their child through natural means (i.e., food) than by investing in medicines that might end up doing more harm than good.

The health care providers interviewed also shared the above opinion. They said they stressed the importance of a good diet to their patients but admitted that mothers often asked for prescriptions for vitamins to stimulate their child's appetite. The nurses and physicians interviewed said that even when they do recommend vitamins, mothers rarely give the appropriate dose. Problems with adherence to the instructions were attributed to both the lack of economic resources and the lack of knowledge about the importance of supplements. Because of these problems, health personnel preferred not to recommend vitamin supplements. As mentioned previously, health care providers did not recognize anemia as a problem in children aged 6–24 months; thus, physicians were not in the habit of prescribing iron supplements.

From the mothers' point of view, adherence to the instructions given by the physician would depend on their confidence in the physician, the cost of the supplement, and their perception of the need for or the importance of giving the supplement at the time. This was supported by the experience of four mothers who lived in the low zone, had a relatively stable income themselves or a spouse who provided it, and had given their young child iron supplements. Three of the four mothers were insured by the Peruvian social security, which implies that they or their husbands had stable employment in the formal work sector. One mother had gone to the social security service, where the pediatrician said her child needed iron, but she did not believe him because the child did not seem sick. Instead, she took her child to a private physician who told her the same thing, after which she began to give the child iron supplements.

Overall, in both the low and high zones, two of five mothers in the quantitative study reported having given vitamins to their child. In 90% of these cases, a physician had prescribed the vitamins. The reasons mothers most frequently gave for deciding to give a vitamin included reinforcing defenses or assisting growth (20%); the physician's recommendation (20%); or the child's being thin (15%), losing appetite (15%), having anemia (13%), being sick (7%), or having weak bones (2%). Although the numbers were small, 33% (3 of 9) and 17% (5 of 30) of mothers with children below age 12 months and age 12 months or older, respectively, said they had given vitamins because the physician prescribed it. Mothers with children older than 1 year were more likely than those with children younger than 1 year old to give reasons for giving vitamins that were related to the presence of symptoms.

Table 4.12. Duration of supplementation (survey data)

Time vitamin was given	Overall (n=39) (%)
1 week or less	13
2–3 weeks	20
1 month	26
2 months	15
3 months	2
More than 3 months	23
Total	100

The vitamins given to infants and young children included a variety of multivitamin supplements. The supplement most frequently prescribed to mothers (23%, n=39) was a product in drop form comprising vitamins A, C, and D; another 23% of the mothers mentioned a product containing iron. Table 4.12 shows the duration of vitamin supplementation. Although the numbers are small, nearly one-half of the 39 mothers had given the supplement for only 2–4 weeks and less than one-fourth had given it for more than 3 months. Most mothers (85%) said they had not experienced any difficulties in giving the supplement to their child, but 67% said that they had forgotten to do so at least once.

Ten mothers reported that they had at some time given an iron supplement to their child. Four of these mothers mentioned a product known not to contain iron and one could not remember the product.

In terms of presentation, mothers preferred syrups over drops because they had previous experience with syrups and this formulation was perceived to be less expensive than drops, although it was in fact more expensive per dose. Significantly ($P<0.01$) more mothers in the low zone (26%) than the high zone (2%) said they preferred drops whereas the opposite was true for syrup (70% vs. 92%) ($P<0.01$). Overall, child age influenced mothers' preference for the type of formulation: 65% and 21% of mothers with children aged 6–11 months preferred syrup

Table 4.13. Supplement presentation preferred, by age group and zone (survey data)

Age group	High zone (%)	Low zone (%)	Overall (%)
6–11 months	n=14	n=15	n=29
Syrup	79	53	65
Drop	7	33	21
Other	14	13	14
Total	100	100	100
12–24 months	n=36	n=35	n=71
Syrup	97	77	87
Drop	0	23	11
Other	3	0	1
Total	100	100	100

Table 4.14. Treatments administered at home (survey data)

Treatment selected	Overall (n=100) (%)
Nothing	27
Herbal teas	39
Rubs or massages	29
Medicines	20
Vaporizations	1
Specific foods	1
Others	2
Total	100

and drops, respectively, compared with 87% and 11% of mothers with children aged 12–24 months (Table 4.13).

Decision-making for Seeking Health Care and Health Care Options

The most frequently mentioned illnesses for children aged 6–24 months were respiratory infections and diarrhea. In the quantitative survey, 63% of mothers reported that the last illness of their child (whenever it occurred) was a respiratory infection whereas 24% said that it was diarrhea.

Whatever a child's ailment, the patterns of health-seeking behavior were quite similar. When the child's first symptoms appeared, mothers attempted to manage at home by using herbal teas (Table 4.14). Another common practice was to use medicine left over from an older sibling's illness or a previous episode of a similar sickness. Alternatively, if the mother knew the name of the medicine that she thought was successful in treating a similar previous illness, she may have gone to the pharmacy and asked for it directly. Mothers said that if household treatments did not succeed, they might seek help outside the home. The two factors influencing this decision were perception about the severity of the illness and economic resources. If after several days of home treatment the child did not get better or seemed to worsen, it was time to get outside help. The symptoms that caused greatest concern were a high fever, loss of appetite, and weight loss. Because of the precarious economic situation of many households in the study area, having the money to pay for a doctor's visit and medicines was another factor in decision-making.

During the health-seeking process, several people—neighbors, husbands, and grandparents—may offer opinions. Neighbors who have young children themselves may be consulted on the proper course of action to take. At times these opinions were given despite being unsolicited. Husbands seemed to enter more strongly into the process when money was involved (i.e., when medicines needed to be purchased or a doctor needed to be consulted). In the survey 51% of mothers said the father was involved in the decision to buy medicines and 89% said the decision depended on money more than any other factor. Despite all the input, the mother made the decision and it was she who took the child for consultation (Table 4.15).

If help was sought outside the home, several formal and informal options were available (Tables 4.15 and 4.16). The Ministry of Health has a maternal and child hospital (Manuel Barreto) with four health posts under its jurisdiction. In addition, the municipality has a health service as does the Catholic Church. In general, mothers said they tended to use the formal health services more frequently. Mothers expressed confidence in these services and commented that they had always gone to the same place. They especially had a favorable opinion of the largest Ministry of Health establishment, Manuel Barreto. Some mothers did not realize that one health post was operating again after having been closed for several years. Patients pay a small fee for the Ministry of Health services. Nevertheless, many people could not afford this fee much less the medicines the physicians prescribed. Some mothers said that if the doctor gave them a list of medicines, they tried to decide which was the most important for their child and buy only that one.

Besides the formal health care providers in the area, there were also traditional healers or women "who know." These women were usually older neighbors, sometimes grandmothers, who have experience in treating *susto*. A child with *susto* needed to be taken to a woman who knows so that she could pass the egg over his body and thereby cure him. *Susto* was not associated with anemia. The women who know were reportedly not consulted for the more common childhood illnesses that, if severe enough, would need formal medical attention.

In many cases several options, both formal and informal, are used for the same illness. This occurs mostly when mothers feel treatment by an initial option fails and they resort to another option. In some cases mothers chose to

Table 4.15. Decision-making processes

	In-depth interviews[a]			Survey (%)		
	Low zone	High zone	Overall	Low zone (n=50)	High zone (n=50)	Overall (n=100)
Who decides when the child needs intervention						
Mother	+++	+++	+++	na	na	na
Who decides what to do						
Mother	+++	+++	+++	na	na	na
Who is consulted						
Father	++	++	+	na	na	na
Sister-in-law	+	+	+	na	na	na
Neighbors	+	++	+	na	na	na
Is their advice followed						
Yes	+++	+++	+++	na	na	na
Factors that influence the decision:						
Symptoms worsen	+++	+++	+++	na	na	na
Money	++	++	++	na	na	na
Type of illness	++	++	++	na	na	na
Attends healthy-child visits	+++	+	++	78	94	86
Factors that influence this decision:						
Attend						
To make sure child is growing well	++	+	+	na	na	na
To learn new things	+	0	+	na	na	na
Do not attend						
Lack of money	0	++	+	na	na	na
Not necessary any more	0	+	+	na	na	na
Who takes the child						
Mother	+++	+++	+++	96	90	93
Who decides to buy medicines, etc.						
Mother	+++	++	++	48	44	46
Father	+	+	+	14	4	9
Both	0	++	+	44	40	42
Factors that influence this decision:						
Mother's appraisal of child's health	+++	++	++	4	4	4
Money	+++	+++	+++	80	96	88
If physician prescribes	+	+	+	0	0	0

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses, na indicates not asked.

resort to formal and informal health care providers simultaneously. For example, if a child with *susto* has diarrhea, the mother might take the child to a physician to treat the symptoms and a traditional healer to cure the *susto*.

Potential Sources of Iron Supplement

The Ministry of Health has a growth and development program (Crecimiento y Desarrollo, or CRED), which would be a logical program to include iron supplementation as proposed by the Ministry of Health as well as the pediatric consultancy attending sick children. Mothers said they thought that having the child's height and weight checked was important to make sure the child was growing well. Some mothers suggested that it was sometimes difficult to tell if a child was growing well because appearances were often deceiving.

From other studies it is known that mothers associate going to CRED with immunizations. Currently, the emphasis in CRED is to evaluate children's psychomotor development, which is done at each regular visit. During the first 6 months of life, an infant's monthly visit to CRED coincides with the vaccination program, and attendance rates are high. These visits include nutrition education and breast-feeding counseling, which are generally standardized and appropriate. During the second 6 months if life, CRED visits are scheduled at ages 6, 9, and 12 months. Beyond age 6 months, however, CRED attendance rates fall because mothers do not perceive that taking their healthy children for checkups is necessary. When they do go to the health center, it is for treatment of an illness. The nutrition education given—if it is given—is usually very general and focuses on the age to introduce foods (6

Table 4.16. Utilization of health care options (in-depth interviews)[a]

	Low zone	High zone	Overall
Options available			
Formal	+++	+++	+++
Informal	++	++	++
Which used most often			
Formal	+++	+++	+++
Why			
Confidence in service	++	+++	++
Have always gone to the same place	+	+++	++
Free medical attention	+	+	+
Others used			
Yes	+++	++	++
When			
When treatment fails	+++	++	++
Emergencies	+	0	+
Use more than one for same illness	+++	+	++
Why			
Unsuccessful treatment	+++	+	++
Easiest to use			
Parish	0	+	+
Why			
Free	0	+	+
Best way to supply supplements			
Ministry of Health services	+	++	+
Community organizations	+	+	+
Why			
Doctors should prescribe	+	++	+
Know population	+	+	+

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses.

months) and to give paps or purees. Few specific messages (e.g., to feed micronutrient-rich foods) are given. At age 6 months, if a nutritionist is in the health center, the mother is referred for nutrition advice about the introduction of complementary foods, but this is infrequent. Increasing the coverage of CRED and including iron supplementation through this program is a potential channel for distribution of iron supplements.

In the quantitative survey, 86% of mothers reported having taken their child to CRED at least once. Zonal differences were evident, with 78% of mothers in the high zone and 94% in the low zone having said they had taken their child. Although CRED visits are free, they require travel time and bus fares. To make this investment in time and resources, mothers need to be convinced of the value of these visits.

From the responses it appeared that mothers thought attending CRED was more important for younger (i.e., less than age 6 months) than for older infants. Mothers with other older children seemed less convinced of the need to go. The quantitative survey showed that of the 89 mothers who had ever taken their child to CRED, 89% had done so for the first time when the infant was younger than age 6 months. Of mothers with children aged 6–11 months, 81% said they still took their child to CRED whereas only 47% of mothers with children aged 12–24 months still did ($P<0.05$). The mean age at which other mothers reportedly stopped taking their child was 8.4 ± 4.3 months.

Although not explicitly stated, mothers appeared to have doubts about the benefits of CRED, especially when the mother perceived that her child was growing.

Pharmacies and Drug Shops

When asked what iron supplements were available (precisely in those terms), pharmacy personnel listed a variety of vitamin and mineral supplements, many of which contained no iron. Although most respondents said these supplements were for anemia or the beginnings of anemia, they always added that the supplement helped stimulate appetite or strengthen the body.

The price of iron-containing syrup and drop supplements ranged from US$2.50 to US$10 per preparation. The pharmacy personnel remarked that although they thought drops were more appropriate for young children, syrups were more popular because they were cheaper, particularly the generic ferrous sulfate syrup. Three of the drop presentations were also available in syrup. The drop presentations only contained iron but the syrups also contained vitamins and other minerals.

Household Trial

A protocol for a household trial of iron supplement use was developed from preliminary analyses of the qualitative data. The protocol took into consideration the factors that were found to motivate mothers to give a supplement to their children. Mothers were informed about the purpose of the trial and what their participation entailed. The iron supplement was presented as being like a vitamin and was to be a complement to food to prevent anemia. Mothers were told that children between ages 6 and 24 months were susceptible to anemia because they were just learning to eat; thus, it was very difficult to ensure that they received all the nutrients they needed and supplementary iron would be beneficial for them.

Mothers invited to participate in the trial readily agreed to do so. Because they had all been included in the quantitative survey, they were familiar with the study, project staff, and institution conducting the trial. Some mothers later admitted they had initially had reservations about participating in the trial but, after examining the supplement and checking the expiration date, their misgivings were mollified. Usually husbands and other family members were supportive of their child being included in the trial once they too had checked the supplement. As the trial progressed, however, one mother became wary about it. Although she did not refuse the field worker visits, it was clear she was not giving the child the supplement, apparently because her mother-in-law had expressed doubts about the supplement.

Four types of iron supplement were offered to mothers. These were a generic ferrous sulfate syrup and three drop formulations. The supplements were purchased in local pharmacies and cost between US$2.70 and $5.50 per preparation. All mothers chose the syrup because they had previously had good experience with giving a syrup. One mother said the syrup would last longer because it came in a bigger bottle. Another mother was familiar with the syrup because she had had anemia during pregnancy.

To investigate the problems and difficulties mothers might experience with drops, two mothers were persuaded to use drops. In the end, these mothers were quite pleased because administering the drops straight from the dropper into the child's mouth was easier than administering the syrup.

Mothers who chose the syrup were supplied with a syringe and shown how to measure the correct dose, because these instructions were not included in the box. Some mothers measured the syrup using the syringe and then gave it to the child with a spoon whereas others squirted the syrup straight from the syringe into the child's mouth. They were asked to give the supplement to their child for 2 weeks.

The main problem mothers expressed about the iron supplement was that the children did not like the taste. To overcome this, four mothers opted to give fruit juices or let the child suck on pieces of fruit immediately after giving the supplement.

Five mothers gave the supplement in the afternoon and one gave it in the morning. Four mothers had no problem giving the supplement an hour before or after food and thought this was a good idea as the child could assimilate it better. Two mothers thought that this regimen was particularly difficult because their child was accustomed to frequent snacks.

All mothers forgot to give the supplement at least once, usually because of an alteration in the child's sleeping or feeding pattern. One mother did not give the supplement the day her child had diarrhea because she thought the child would "waste it." Also, mothers were very worried about adhering to a precise schedule. Although they were told that if they forgot to give the supplement at the usual time they could always give it later, they still expressed concern about the effects of forgetting. Some mothers, especially in the high zone, referred to the supplement as treatment and were concerned that if they forgot or did not give the supplement at the same time, the treatment would be interrupted and would lose some effect.

At the end of the trial most mothers said they were pleased because their child's appetite had increased and one mother said her child had gained weight. All mothers said they would like to continue giving the supplement so the child would become stronger and have better defenses. When asked how much longer they would consider giving the supplement, most said until they ran out.

Child Feeding Practices

Breast milk was considered extremely important and beneficial for a child. It was said to protect children below age 6 months against poor health, aid growth, and complement the feeding of older children. From the structured interviews, 97% of mothers reported breast-feeding their last-born child (Table 4.17), and 97% with infants aged 6–11 months (n=29) and 65% with children aged 12–24 months (n=68) were still breast-feeding. Of the 25 mothers who had stopped breast-feeding at the time of the survey, only 4 had stopped before the child was age 6 months.

Exclusive breast-feeding for infants below age 6 months, however, was not widely practiced. Four of five mothers reported having given their infants herbal infusions from birth to age 6 months (Table 4.17). These were given to quench a child's thirst and because they were thought to prevent or cure gas or colic. The infusions most frequently given were aniseed water and camomile, which were considered to aid digestion. Both are iron absorption inhibitors, especially aniseed (Pizarro et al. 1994). The infusions were mostly given in feeding bottles, although one-third of the mothers reported using a spoon.

Table 4.17. Child feeding practices

	In-depth interviews[a]			Survey (%)		
	Low zone	High zone	Overall	Low zone (n=50)	High zone (n=50)	Overall (n=100)
Last child breast-fed						
Yes	+++	+++	+++	96	98	97
Age infusions/teas introduced						
<4 months	na	na	na	60	72	64
4–6 months	na	na	na	26	6	16
>6 months	na	na	na	2	6	4
Never given	na	na	na	12	16	16
Age other milks introduced						
<4 months	na	na	na	26	38	32
4–6 months	na	na	na	14	12	13
> 6 months	na	na	na	11	18	20
Never given	na	na	na	38	32	35
Age of introduction of other foods						
<4 months	+	+	+	10	22	16
4–6 months	+++	+++	+++	72	62	67
>6 months	+	+	+	18	14	16
What foods						
Soups	+++	+++	+++	40	44	42
Thin purees	+++	++	++	60	48	54
Foods from the family pot	+	0	+	0	2	1
Other	0	0	0	0	6	3
Frequency fed per day						
1	0	0	0	0	6	3
2	+	+++	++	30	26	28
3	+	+	+	42	44	43
4	+	0	+	22	16	19
5 or 6	0	0	0	6	6	6
Who gives food						
Mother	+++	+++	+++	84	74	79
Grandmother	0	+	+	10	4	7
Father	0	0	0	0	2	1
Other female relative	0	0	0	6	20	13
Given with spoon	+++	+++	+++	100	100	100
Age food from family diet given						
<6 months	0	+	+	na	na	na
6–9 months	+++	+++	+++	na	na	na
10–12 months	0	+	+	na	na	na
What foods						
Soup	0	+++	++	na	na	na
Soup and main dish	+++	0	++	na	na	na
Main dish	0	+	+	na	na	na
Who serves food						
Mother	+++	+++	+++	na	na	na
Grandmother	0	+	+	na	na	na

[a]n=10 for all in-depth interview groups. + indicates 1–2 responses, ++ indicates 3–5 responses, +++ indicates 6+ responses, na indicates not asked.

Nearly one-half of mothers had fed their infants milks other than breast milk (Table 4.17), most often evaporated milk, in the first 6 months of life. Mothers did so because they thought that they did not produce sufficient milk for their babies. Although most infants were reportedly fed with a bottle (83%), 12% were fed with a cup, and 5% were fed with a spoon.

The appropriate age for introducing complementary food varied. Some mothers thought that giving only breast milk until age 6 months would spoil children and they would reject food when it was introduced. Others said that introducing complementary food was important to "form the stomach" so that when children were old enough they could eat adult foods without health problems being

caused. Still others said that they delayed giving complementary foods until after age 6 months because they did not have money to buy food that they thought the child needed. Overall, the quantitative survey showed that the mean age for introducing complementary food was 5.6 ± 2.0 months; there were no zonal differences. This finding was similar to that from the qualitative study (Table 4.17).

Soups and broth along with thin purees were considered the best foods to introduce to an infant because the best part for infants is the broth, the "substance" of the soup (Table 4.17). Although mothers recognized that the quality of the broth depends on the types and variety of the ingredients, they did not perceive the best part of the soup to be the solid food because its goodness comes out during cooking. This idea persists despite the education campaigns, of which mothers were aware, stating that infants should be fed purees. Mothers were concerned about the child's ability to swallow and feared that the child might choke if the food was too thick or eaten in whole pieces; therefore, they preferred to feed liquid and softer foods, which are easily given, swallowed, and digested.

The foods considered good for children included micronutrient-rich foods that were relatively soft and easy to swallow and digest. Among these were milk, chicken liver, eggs (particularly the yolk; the white of the egg was associated with allergies—information provided by health care providers—and considered harder to chew than the yolk), and yellow vegetables such as squash. Milk was given regularly and chicken liver was given between one and four times per month. Fish was considered a good food but mothers were afraid to feed it at an early age because of its association with allergies, which could negatively affect the healing of cuts or wounds. Mothers also feared the child might swallow a bone; thus, fish broth was preferred. Beans were considered nutritious but indigestible for small children and were not given until age 9 or 10 months. Dried split peas, however, were given at an earlier age because they do not have a skin. Lentils also were given at an earlier age than beans. Other than milk, micronutrient-rich foods were given in very small quantities. Although many mothers mentioned that all foods are considered good and contribute to the child's general health and growth, the specific foods mentioned are considered to have a specific quality especially beneficial to the child's nutrition. Most mothers did not identify any particular food as bad for children's health.

Other micronutrient-rich foods that require more chewing, such as meat or foods cooked in whole pieces, were not given to small children until they had teeth and could chew the food. Mothers said that whole pieces of food could cause choking and stick to the intestines and that larger pieces of meat could cause diarrhea. Mothers reported that they offered food from the family pot, taking care to mash it into a puree, and fed a small amount so that it did not harm the child. Sixty percent of caretakers thought that a child could eat everything by age 1 year, 20% said by age 2 years, and 20% said after age 2 years.

Feeding infants and young children vitamin C–rich fruits with a meal to enhance nonheme iron absorption was not a common practice and would be difficult to apply to this age group, although fresh or fortified packet fruit drinks could be given. Milks most commonly used are powdered whole milk and evaporated whole milk.

Children in this population tended to eat small quantities of food at various times during the day, mostly during the morning, with little food in the afternoon and the evening. Children also tended to eat little at mealtimes and often did not finish all that was offered to them. Poor appetite was reported to be a common problem. Mothers said they generally fed their child milk and bread at breakfast, perhaps a banana or orange midmorning, soup or puree at lunch, and leftovers (heated soup) in the evening. The frequency and quantity offered varied with age but, in general, small amounts of solid food were consumed. Just under one-half (46%) of the mothers with children aged 6–11 months reported feeding their children twice per day compared with one-quarter of the mothers with children aged 12–24 months, most of whom reported giving food three times per day. Although, observations have shown that children nibble during the morning, such eating may not be reported by the mother as feeding times.

Most mothers reported that they fed their child themselves from a separate plate and used a spoon (Table 4.17). Sometimes the child got supplementary food from the mother's plate.

Discussion

This study was conducted in periurban Lima, which includes almost one-third of the country's population. Other studies relating to child feeding practices indicate that the practices and perceptions are similar to other coastal areas in the country (50% of the total population). These results are not necessarily applicable to rural populations (28% of the total population), but nevertheless are a useful input for the Ministry of Health programs to promote the use of iron supplements in small children in other urban settings.

The results of this study demonstrate that mothers of this population recognize a marked relationship between food and health. Good nutrition and food are believed to play a critical role in maintaining good health at any age. This role is even stronger for children, because the result of good nutrition—growth—is such an important part of the definition of good health. Appetite and weight loss were of great concern to mothers because a child must eat and grow to have strong defenses and, therefore, good

health.

Nevertheless, the results confirm several feeding problems during infancy and early childhood that have been described in other studies in similar areas of Peru. These can be summarized as the feeding of foods with low energy density; an inadequate intake of micronutrient-rich foods, particularly those with a high micronutrient bioavailability (animal products); and the infrequent feeding and small quantities of food being consumed, combined with poor appetite.

Perceived associations between blood and health or blood and food, however, are weak. Mothers believe that being well nourished means being healthy and, therefore, presumably that one's blood is healthy too. However, this is not an issue commonly considered by mothers.

In this context anemia is the name given to a condition of weakness primarily resulting from a poor diet. Although mothers in the study recognized many signs and symptoms of anemia, these were also associated with other childhood illnesses and not specifically with anemia. Moreover, mothers did not perceive that their young children were at risk for anemia. The only sign considered an indication of anemia was paleness, but this was not something to be alarmed about. Similarly, health care providers were not aware that anemia was prevalent in small children, and only infrequently were children check for anemia. An iron supplementation program would need to incorporate strategies to increase awareness of the risk for anemia in children aged 6–24 months in mothers, health care providers, and the community in general.

With respect to the treatment and prevention of anemia, the results indicate that because anemia is thought to result from a poor diet, the solution—preventative or curative—is an improved diet. This improvement can come from increasing the quantity of food consumed in general or increasing consumption of foods thought to be particularly nutritious, such as animal products and vegetables such as artichoke and beetroot. Iron supplements or vitamins were considered an appropriate part of the treatment for anemia but secondary to food. In general, mothers demonstrated a favorable opinion of vitamins. They were thought to stimulate appetite and to reinforce the child's diet, opinions shared by health care providers. Nevertheless, vitamins were considered medicines and, as such, mothers said they should be prescribed by a physician because they are chemicals that may harm the child.

Factors That May Constrain or Promote the Use of Iron Supplements

Anemia is not considered by either mothers or health personnel as being a particular problem in children, particularly small children. This is a prime constraint for the promotion of the use of iron supplements. There needs to be an awareness of the need to give the supplements as a condition for the motivation to do so. This needs to be a first stage in a promotion campaign: changing knowledge and attitudes of these target groups concerning the vulnerability of small children to anemia. This has been achieved through education campaigns with adult women in this population, so the potential for change does exist.

On the positive side, there is an awareness of a relationship between anemia and health and anemia and food in adults and among good nutrition, food, and good health in children. These understandings give potential for promoting an awareness of anemia in children and thus the use of supplements. The focus of food, nutrition, and health in a family is most frequently on the small child, thus the potential exists for positioning the giving of supplements as part of an integral approach to protect this vulnerable group—which can be emphasized in a program.

Vitamins are not considered a necessity for children and are considered secondary to a balanced diet; nevertheless, they are considered to serve a purpose by complementing the nutrition of small children in certain circumstances. This too, could favor the promotion of a supplement.

The use of supplements that are hard to give to the child and the adherence to a schedule for a relatively long time are definite constraints to the maintenance of a program. Ways of simplifying the supplementation, such as finding more acceptable preparations, using a supplement with food, and helping mothers to find ways of giving the iron, will all increase adherence to a program.

In the present study, aspects related to the potential of giving of iron supplements to small children in periurban populations were explored. The potential to do this in rural populations of Peru where food—particularly iron-rich food—is less available and accessible remains unknown. This would need to be explored before a a national campaign is developed.

Programmatic Implications

The Ministry of Health of Peru is already distributing iron supplements to children in several areas of the country as part of its integrated management of child health. The results of the present study have been shared with different sectors of the Ministry of Health via dissemination and some training of health personnel (including their Information, Education, and Communication programs). Several of the issues raised have contributed to the interventions. One result is that the programs have commenced with training courses to increase awareness of health professionals about anemia in children, attitudes and perceptions of mothers, and issues involved.

The results of this study show that the promotion of the use of iron supplements should be an integrated part

of improved infant and child feeding and not promoted separately. Largely as a result of this study, the Ministry of Health in Peru is taking this integrated approach, at least in periurban populations.

In Lima, as in other urban centres of Peru, cheaper iron-rich foods are available and accessible to most of the population. In these programs the iron supplements are positioned as a complement to food and thus integrated with child feeding. The principal recommendations of the Ministry of Health for the nutrition education in the child growth and development programs—as well as other education contacts with the health services—is improved infant feeding. The primary results of nutritional deficiencies in Peruvian children are anemia and growth retardation, which are probably associated with other micronutrient deficiencies. Thus, improved infant feeding is recommended, which includes iron-rich (and other micronutrient-rich) foods in the context of a mixed diet, with supplements as a complement. The messages are primarily to give children a thick preparation such as puree, include a special ingredient (micronutrient rich), give an adequate amount, give food five times a day, and feed with patience. The regular calculation of the cheapest food source of iron with current market prices enables the selection of the most accessible foods as well as those shown by ethnographic studies conducted in different parts of the country to be most acceptable for use with small children. Nutrient-rich recipes appropriate for small children have been developed by the Institute of Nutrition Research with mothers to select those most acceptable; these recipes have been published in booklets and are distributed by the Ministry of Health along with other IEC materials and used in demonstrations with groups of mothers. These messages are beginning to be used through the health establishments, particularly the health centers in periphery populations of the cities.

The Ministry of Health program was initiated in periurban sectors of the population in Lima during the past year and is now being extended to several other areas of the country. The attitudes, perceptions, and potential reactions to the use of supplements in populations dissimilar to the Lima population—namely the highland and rural populations—need to be understood.

Further Research Questions

Understanding the process and results of the Ministry of Health program in the different parts of Peru will be important. This understanding will give insights into how to improve the program (including better child feeding practices), the acceptability of and adherence to the supplements, and better communication for the adoption of the program. Implementing effective nutrition education programs is a constant challenge in Peru and, although advances have been made in some areas, implementation needs to be constantly examined and innovative approaches have to be found. Nutrition education through the health services in Peru tends to be rather traditional—effective in changing knowledge but not necessarily in changing behavior. Initiatives with new approaches are encouraging but are not yet widespread.

A major area for research is how to promote and position iron supplements in the more remote (particularly highland and jungle) areas of Peru where anemia and chronic undernutrition are prevalent in young children. Many of these areas have a monotonous diet with a limited choice of food; micronutrient-rich foods are not easily available nor are they culturally part of the diet of the small child. Consequently other strategies and ways of positioning the use of iron supplements in small children need to be found. With the initiation of the Ministry of Health supplementation program in these areas, there is great potential for exploring the attitudes and perceptions of the population towards this and the possibilities for acceptance, use, and adherence within the program's context.

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5: FINDINGS OF THE SRI LANKA COUNTRY STUDY

Lalini C. Rajapaksa

Background

Sri Lanka is an island in the Indian ocean with a central hilly region that is surrounded by a plain. The southwest part of the plain is a high-rainfall area whereas the rest of the country remains dry for a large part of the year; thus, the island can be divided into dry, wet, and intermediate zones on the basis of rainfall.

The island has not experienced the rapid rural-to-urban migration observed in many developing countries, and most of the population (85%) live in rural areas. Although urbanization has been slow, the urban population has grown considerably over the past two decades. This has resulted in the development of urban low-income areas or communities where poverty, lack of basic amenities, limited education, and undernutrition adversely affect the health of residents.

Tea estates are in the central hilly area of the country. Most of the population residing on the estates are descendants of indentured labor brought to the country from south India by the colonial rulers to work on the tea plantations. They have distinct sociocultural characteristics. The society is hierarchical and male dominated. Women have the burdens of working on the estates, reproduction, and housekeeping. The health conditions of the population, particularly of the women and children, are lower than those in the rest of the country.

Health care is provided by both the public and private sectors. Public sector services encompass a range of preventive, curative, and rehabilitative care and cover nearly 60% of the population. Private sector health care is mainly curative and accounts for nearly 50% of all outpatient care. Private health care services are largely concentrated in the urban and suburban areas. Although allopathic, Ayurvedic, Unani, Siddha, and homeopathic medicine are practiced, Western allopathic medicine is the main type of medical practice used by the most people.

A network of curative care institutions of different levels are spread throughout the island. They range from sophisticated teaching hospitals, provincial general hospitals, and base hospitals, where the major specialties are provided for; to district hospitals and peripheral units, where inpatient services are available; to central dispensaries that provide only out patient care. On average a health care facility is located within 1.4 km from all homes, and a free government allopathic health facility is located within 4.8 km of all homes (Ministry of Health 1998).

The divisional directors of health service and medical officers of health are responsible for preventive and promotional health care in a defined area, covering a population of 60,000–80,000 people. Trained health staff of different cadres work at the field level. The public health midwife (family health worker) is the health care provider for domiciliary service grassroots level. This person is mainly responsible for services to mothers and infants in the community and is the link between the community and the public health system.

The country has good socioeconomic indicators including high literacy (90%), low infant mortality (16.5/1000 live births) (Ministry of Health 1998), a life expectancy of 70.9 years for men and 75.4 years for women, and a low total fertility rate of 2.1. (United Nations Population Fund 1998). The high literacy rate, especially for women, has been instrumental in increasing the use of health services, and coverage of preventive services is very high (e.g., childhood immunizations are all more than 80%) (Ministry of Health 1998).

The impressive gains in health and population outcomes over the past 60 years may be attributed to a high degree of commitment to social welfare and an expansive social welfare package implemented continuously since independence. These measures have resulted in widespread access to free health care and high levels of education for both men and women. Paradoxically, the achievements in the health and demographic sector are not reflected in the nutrition sector. Severe clinical undernutrition is rarely seen today but moderate undernutrition remains a problem of public health importance. The demographic and health survey of 1993 found that 24% of children aged 3–60 months were stunted, 38% were underweight, and 16% were wasted (Department of Census and

Statistics 1995). Moreover, the prevalence of undernutrition increased rapidly after age 6 months and leveled off at around 18 months; thus, the critical period for nutritional vulnerability was between ages 6 and 18 months, which points to probable deficiencies in complementary feeding practices.

Prevalence of Anemia in Children

Anemia has long been recognized as a public health problem in Sri Lanka. The problem among preschool children was identified as early as 1973 by De Mel and Sood (1973), who carried out an anemia survey that included preschool and primary school children. They reported high prevalence rates of 70% in preschool and 52% in primary school children.

The first national anemia survey in children aged 6–71 months was conducted in 1975–1976 (Ministry of Health 1976), and the prevalence of anemia in the preschool age group was reported to be less than 4%. The much lower prevalence of anemia in preschool children in the 1975–1976 national survey than in the De Mel and Sood (1973) study may be partly because the 1975–1976 survey used a lower cutoff point for anemia (hemoglobin <100 vs.<110 g/L) for children below age 2 years. Nevertheless, no explanation was given for the lower prevalence rate found in the 1975–1976 survey.

National data on anemia are available from the 1995 National Nutrition and Health Survey (Mudalige and Nestel 1996). The prevalence of anemia in preschoolers (aged 3–59 months), primary school children (5–10.9 years), and adolescents was 45%, 58%, and 36%, respectively. For the preschoolers the prevalence of anemia was highest for children below age 2 years (ranging from 52% to 57%) and lowest for those aged 49–59 months (31%). In the preschool children anemia was associated with nutritional status, and 62% of the children both stunted and wasted were anemic compared with 44% of the children who were not undernourished. Prevalence rates also varied by provinces but not by sector (urban, rural, or estate).

The commonest cause of anemia in Sri Lanka is iron deficiency resulting from the poor intakes of highly bioavailable iron in the diet, although parasitic infections such as malaria and hookworm contribute to the problem. The Sri Lankan diet of rice, pulses, coconut, and vegetables provides about 10 mg iron daily, but only up to 10% of this is absorbed because of the high intake of iron absorption inhibitors such as phosphates, phytates, oxalates, and tannins even in populations consuming large quantities of meat (Wikramanayake 1996a).

In infants and young children, anemia is attributed primarily to the low content of bioavailable dietary iron coupled with the high requirements for growth and development. The pattern for growth faltering is very similar to that for the prevalence of anemia and is due to inadequacies in complementary feeding.

Anemia Control Policies and Programs

Although sufficient evidence is available to show that anemia is a widespread problem not confined to pregnant women, intervention programs have focused on this group. The two principal iron-related interventions carried out by the Ministry of Health are nutrition education and iron supplementation. Nutrition education is carried out in a variety of settings (e.g., schools, community education programs, antenatal clinics, and child welfare clinics). The education programs may be a part of nutrition education in general or specifically directed at anemia.

The Ministry of Health does not have an iron supplementation program for infants and young children. The antenatal care program includes the distribution of iron and folate supplements and an oral anthelminthic drug. In areas with endemic malaria, weekly malaria prophylaxis is also provided to pregnant women. These prenatal interventions have reduced the prevalence of anemia to some extent from the very high figure of 77% reported by De Mel and Sood in 1973 but it remains a sizable public health problem. The recently reported prevalences in pregnant women vary from 58.4% in a study by Atukorala et al. (1994) and 69% in a study by Goonewardene et al. (1995) to 38.6% in a study by Mudalige and Nestel (1996). (In all four studies the definition of anemia used was a hemoglobin concentration of less than 110 g/L).

There is also a Ministry of Health supplementary feeding program targeted to all pregnant and lactating mothers and to preschool children with growth faltering. The food (*thriposha*) is distributed through antenatal and child welfare clinics and provides 9 mg iron and 20 mg ascorbic acid per 50 g food. All categories of beneficiaries are expected to consume 50 g/day of *thriposha*. If, in the absence of information on bioavailability of iron from *thriposha*, a middle-level bioavailability is assumed, the supplement will provide about 15% of the recommended daily intake of iron for preschool children and 10% of the recommended daily intake for pregnant women (I. Tudawe, unpublished, 1998).

There are 11 iron-containing pediatric micronutrient supplements currently available in the commercial market that can be bought over the counter (T.W. Wikramanayake, unpublished, 1998). Only 7 of these preparations are in a syrup or liquid form, making them suitable for young children.

Review of Relevant Ethnographic and Qualitative Studies

Little information exists on the food beliefs and practices that may affect infant and child feeding in Sri Lanka. Nevertheless, the hot and cold concepts of foods are widely known although not practiced by everyone and are prob-

ably related to the humoral theory of disease derived from the teachings of Susrutha (c. 600–500 BC) and Charaka (c. 200 BC). The indigenous forms of medical practice—Ayurveda, Siddha, and Unani systems—are based on these teachings. Health and sickness are believed to depend on the harmony or disharmony of the three humours: *va* (air), *pith* (bile), and *sem* (phlegm). The activity of these elements can be modified by heating or cooling the body, and food is one of the four factors that may be used for this purpose (Wikramanayake 1996b).

The hot and cold concepts of foods were highlighted by Liyanage and Wikramanayake (1984) in their studies on food avoidance during pregnancy and lactation. The "heaty" foods identified included fish, chicken, sardines, egg, meat, *dhal* (lentils), beans, eggplants, tomatoes, and some green leafy vegetables. Heaty foods were believed to cause skin eruptions and diarrhea. Among the foods considered as "cooling" were okra, pumpkin, beetroot, banana, and some green leaves such as spinach and mung bean. These foods were believed to increase phlegm, which would result in colds and chest infections. Apart from being heaty or cooling, specific reasons were given for avoiding certain foods during pregnancy and lactation partly because of their perceived harmful effects on the fetus. A study of weanling practices by Karaliedde et al. (1982) found that many mothers avoided giving foods considered hot or cold during an infant's first year.

Overall, the problem of iron deficiency during early infancy and childhood has attracted scant attention. Formulations of an iron supplement suitable for infants and young children are not freely available through the public health system. If successful iron-containing supplementation programs targeted to this age group are to be planned, knowledge about sociocultural beliefs related to health and feeding, perceptions about iron deficiency, and other barriers to use are essential.

Study Setting

This study was carried out in urban, rural, and estate sectors. Within the rural sector, both the dry and wet zones were included. Because most of the Sri Lankan population live in rural areas, two rural locations were selected for study—one in the dry zone where malaria is endemic and the other in the wet zone where transmission of helminthic infections is known to be high.

In the dry zone the study areas were selected from one of the districts of the North Central Province (Anuradhapura, a predominantly agricultural district). The district records show a high prevalence of anemia (54%). Four villages were identified within this district; two were a part of the old irrigation settlement programs and two were newer settlements under the more recently implemented irrigation scheme (Mahaweli scheme). The purposive selection of villages allowed for a cross section of rural agricultural households to be included in the study. Malaria is endemic in this area

In the wet zone the district of Kalutara, one of the three districts of the Western Province, was selected. Parts of the district are very remote and border on the natural rain forest. Four sites were selected within this district. In the selection of these sites, attention was paid to enable a wide geographic representation of the area and to include a wide cross section of the population. The four areas selected for the study included two remote villages, a suburban area, and a fishing village in the coastal area. Kalutara district is an area where transmission of soil helminths is known to be high.

Although the availability of health care and other facilities in the urban areas is comparatively better than in the rural areas of the country, the urban low-income families could be considered to be a group at high risk for common morbid conditions, including nutritional problems. These communities live under poor environmental conditions and usually belong to lower social and economic strata of the society with relatively less education. For these reasons it was considered appropriate to include an urban slum area within the municipal council area of Colombo as one of the study areas.

People living in the plantation sector have relatively poor health status indicators, including nutritional status indicators, compared with people in other areas. The population in this sector has marked sociocultural differences, hence the decision to include the estate population in the study. Residents from four estates in the Hatton-Dickoya region were selected for study. The estate population of the area is representative of the population of laborers of Indian origin living on the tea estates. The area was selected because two experienced workers were available who would be able to carry out the interviews and focus group discussions. An iron fortification study is being implemented in some of the estates in this region. The estates selected for the present study did not include those with the fortification program. The presence of two health care workers experienced in the techniques of data collection suggested that many health-related programs were being carried out in these areas. Because the community is insular and language is a barrier, the feasibility of outsiders going into this setting and carrying out a study of this nature was low, especially in the time available. The possibility of implementing local supplementation programs in the urban low-income areas and in the plantation sector was an additional reason for selecting these locations.

Research Methods

The methods described in Chapter 1 were used in data

collection. Information was obtained from key informants, mothers with children below age 2 years, male heads of households, and elderly women

Key informants were purposively selected in each setting. They included 23 public health midwives in the government sector, 2 practitioners of indigenous medicine in villages, and 5 pharmacists. Sixteen medical officers of health participated in three group discussions held at each of the study areas other than in the estate sector. On the estates, 8 estate medical assistants were interviewed. All key informants were from among those serving within the municipality of Colombo and the districts of Anuradhapura, and Kalutara. The key informant interviews were used to refine data collection instruments, identify local terms used, and cross-check information obtained from the population.

Mothers with children below age 2 years were studied in each study area. Four focus group discussions, each focus group consisting of 8–10 persons, and 20 in-depth interviews were carried out at each setting. Eighty-three interviews were done in all and 140 women participated in focus group discussions. At each site one focus group and 6–8 in-depth interviews were carried out with male heads of households. A total of 27 persons belonging to this category were interviewed and 32 participated in focus group discussions. At each site outside the estate sector, 5–6 older women were interviewed; 23 women in this category participated in the study.

After the purposive selection of villages, two random households were selected by using the list of householders available from the *gramasewaka* (the lowest level local government officer). Starting from each of the randomly selected households, the interviewers visited the house closest to the selected house until five women with children below age 2 years and three or four male heads of households were identified and interviewed. Households were visited in the evenings to facilitate interviews with men and women who worked outside the home. A similar procedure was followed for inviting men and women for focus group discussions.

Verbal consent was obtained from the individuals who participated in the study. The medical officer of health and the *gramasevaka* of the area were informed about the study and their cooperation was sought. Ethical clearance for the study was obtained from the ethical review committee of the Faculty of Medicine, University of Colombo.

All information was recorded in Sinhala, the language in which the interviews and discussions were conducted except at the estate site. At the estate site the interviews were carried out in Tamil and the information was initially recorded in this language. The information was then translated into English by the two data collectors. At the end of each day the data from each interview were summarized in the notebooks. Once the interviews at a site were completed, all the records were reviewed by the principal investigator and the research team, responses were grouped into categories, and codes were agreed on. Tally counts of respondents who fell into a given code were determined. Information from focus groups was reviewed and the ideas expressed were given a relative weight on a scale of three plus signs to zero. The data obtained from the different population groups and data obtained by using different techniques are used for cross-validation. Data were analyzed by sector and collectively.

Results

This section describes the findings from the in-depth interviews and focus group discussions summarized by sector and collectively in Tables 5.1–5.7. Observations made by health care workers are included in the relevant sections.

Characteristics of Women

In general, women from the urban and the rural sectors had similar characteristics and are considered as one group. Those from the estate sector had different characteristics and these have been highlighted in the description of the study population.

Age. In the urban and rural sectors, the ages of the women ranged from 15 to 44 years: 31% were 26–30 years, 26% were 21–25 years, and 22% were 31–35 years. The estate women were younger: 41% were 21–25 years and 31% were 26–30 years.

Parity. In the nonestate localities the parity of the women ranged from one to eight; 46% had one child and 32% had two children, and 7% had more than three children. In the estate sector, the number of children per woman varied from one to four, with only two women (3.5%) having four children; 40% of women had two children and 23% had three children.

Educational level. Of mothers in the nonestate localities, 55% had 11 years or more of schooling (i.e., up to the General Certificate of Education ordinary level examination). However, 10% of these women had not been to school at all, which was similar to the national prevalence of 13.7% (Ministry of Health 1998). The education levels of mothers in the estate sector was much lower, 53% having only completed their primary education and 7% reporting 11 years of schooling or more; 14% of women had never been to school.

Most of the rural participants were from farming families; a few participants from the Kalutara site were wives of government laborers and clerks. Most (92%) women interviewed in the nonestate areas were not formally employed. All participants from the estate sector were employed by the plantation, and all women were tea pluckers.

Perceptions of Health

The meaning of the word used for health in Sinhala and Tamil conveys the concept of absence of disease. Almost all respondents perceived a healthy child as a child who is active and playful. The ability to carry out age-appropriate activity was a characteristic mentioned by most mothers and by many men but only by a few of the older women, perhaps reflecting health education activities in the community. A good weight and weight gain were identified as features of good health by most mothers, particularly in one of the rural settings (Anuradhapura) and on the estates. This feature was not given great importance by the men or by the older women in the community, probably because growth-monitoring activities involve mothers more than the other respondents. A good appetite was identified by some as a feature of good health. Absence of disease was mentioned by a few mothers but by very few men and older women. A chubby child was considered to be a healthy child. This notion was commoner among the men than the women and commoner at Anuradhapura than the other settings. A happy, bright-eyed child was described as healthy by a few young women. A small number of respondents mentioned sleeping well as a feature of health (Table 5.1).

Characteristics of an unhealthy child. The description of an unhealthy child was the opposite of what was described as a healthy child (i.e., an inactive, lethargic child, one who does not participate in play activities). A poor appetite was perceived as a sign of poor health by both young and old women. Falling ill often, irritability and frequent crying, a protuberant abdomen, and slowing of growth and development were mentioned by a few as a sign of ill health (Table 5.1).

Factors that promote and maintain good health. Most mothers had difficulty in appreciating the difference between promoting good health and maintaining good health and at times tended to use the terms synonymously. This may be because the concept of health promotion is not often promoted in education programs. Nutritious food was perceived as very important in promoting and in maintaining health by all respondent groups in all localities. Most respondents mentioned keeping the child clean as a factor promoting good health; some mentioned absence of disease. Clean food was considered important in the promotion of health by respondents in all localities other than the estates. A few mothers stated that protection from illness was important in promoting health. Giving foods at the appropriate time and breast-feeding were perceived by a few mothers as factors promoting health. Regular weighing of the child, loving care, and making the child happy were mentioned by some during focus group discussions in Anuradhapura and the estates as factors that promotes health. (Both these areas have had special field programs for promotion of child development.) Immunization and growth monitoring were mentioned during focus group discussions with young women at all sites. No one recognized child stimulation as a factor promoting development (Table 5.2).

Many respondents thought that taking medical advice often was a way of maintaining good health. This is likely to reflect the importance given to taking infants and preschool children to child welfare clinics. Protecting children from rain and very hot sunshine and giving food and medicines on time were perceived by a few as important. Exploring the concept of giving medicines on time revealed that this pertained to periodic deworming and giving *rathe kalke* to infants. *Rathe* is the term given to any red rash in infants and *rathe kalke* is an indigenous preparation given for the prevention and treatment of this condition. Here again, care, love, and affection were discussed by some in focus groups conducted at Anuradhapura and on the estates (Table 5.2). Charms and occult practices to protect children from harmful influences were also mentioned by a few during focus group discussions in Colombo as ways of maintaining the health of a child.

The lack of nutritious food was a factor mentioned by respondents at all sites as adversely affecting health. Not keeping the child and the utensils that the child uses clean was the next most mentioned factor; this was given particular importance in the urban slum setting and in the estates. (Hygiene is particularly poor at these two sites.) Illness was mentioned by a few mothers and a few men but not by the older women. Not looking after the child well was thought to adversely affect health by a very small group of mothers but was not mentioned by any of the men or the older women (Table 5.3).

Most people said that the sex of the child is not an important factor influencing health status. The age of the child was considered important: the younger the child, the more necessary was protection from illness and germs; special care was necessary until the child was past ages 18–24 months.

An unclean environment was mentioned by most respondents as a cause of illness. Unclean food was specifically mentioned by young mothers and a few older women. Not using boiled cooled water for drinking was stated as a cause of illness by one-fourth of the young women but was not mentioned by the men or the older women. Infectious diseases were mentioned by some of the young women and men but by only a few of the older women. The concept of a microorganism entering the body and causing disease was present in the nonestate community, but only among a minority of the population, and overall only a minority thought that diseases are spread by mosquitoes and flies. Only few respondents mentioned inadequate good food as causing illness. At the estate sites focus group discussions brought out a lack of harmony in the house as a cause of illness in young children,

Table 5.1. Perceptions of health[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Characteristics of a healthy child								
Active and playful	+++	+++	+++	+++	+++	+++	+++	+++
Age-appropriate development	+++	+++	+++	+++	+++	+++	++	+
Appropriate weight or good weight	+	++	++	++	++	+++	+	+
Good appetite	++	++	++	+	++	+++	++	++
Absence of disease	++	+	++	0	+	+++	+	+
Chubby	+	+	++	0	+	+	++	+
Happy and bright eyed	+	+	+	+	+	++	0	+
Sleeps well	+	0				0	+	
Characteristics of an unhealthy child								
Lethargic and inactive	+++	+++	+++	+++	+++	+++	+++	+++
Does not play	++	++	++	++	++	+++	++	++
Poor appetite	++	+	++	++	++	+++/++	+	++
Frequently ill	+	+	+	+	+	++/+	+	+
Irritable and crying	+	+	+	+	+	++	+	+
Developmentally delayed	+					++	0	0

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups..

Table 5.2. Factors influencing health status of young children[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Nutritious food	+++	+++	+++	+++	+++	+++	++	++
Personal hygiene of child	++	++	++	+	++	+++	++	++
Absence of disease	++	+	++	+	++	+++	++	++
Protection from illness	+	+	+	0	+	++/+/0	0	0
Giving food at the appropriate time	+	+	+	0	+	++/+	0	0
Breast feeding	+	+	+	0	+	++/+	0	0
Giving food on time	0	0	0	0	0	+	0	0
Loving care of the child						+++/+ at two sites	0	0
Immunization and growth monitoring	0	0	0	0	0	++	0	0
Taking medical advice	+	+	++	++	+	++/+++	++	++
Protection from rain/hot sun	+	0	+	+	+	+	0	0
Giving medicine on time	+	+	+	0	+	0	0	0

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Table 5.3. Factors affecting health and causes of illness[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Factors that adversely affect health								
Lack of nutritious food	+	++	+	++	++	+++	++	++
Not keeping child and utensils clean	++	+	+	++	+	++/+	++	+
Illness	+	+	+	+	+	++/+	+	0
Not looking after the child well	+	+	+	+	+	+/++	0	0
Causes of illness								
Unclean environment	++	++	++	++	++	+++	+++	++
Unclean food	+	++	++	++	++	+++/++	0	++
Not drinking boiled cooled water	+	+	+	++	++	++/+	0	0
Infectious diseases	+	+	+	++	+	++/+++/0	++	+
Mosquitoes and flies	+	+	+	+	+	++/++	0	0
Microorganisms	+	+	+	0	+	+/++	0	0
Lack of good food	+	+	+	+	+	++/+	0	0
Lack of harmony in the family	0	0	0	0	0	++ (at estate site only)	0	0

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

again probably a result of a specific program directed towards reducing conflict within the family in this setting (Table 5.3).

Association between Food and Health

Most respondents agreed that there was an association between food and health but were unable to explain the nature of the association. The concept that good food gives strength and makes the body grow was present among most respondents. A few thought that inappropriate food or food that was unclean caused illness. Focus group discussions revealed similar perceptions (Table 5.4).

Many types of foods were identified by mothers as being good for children. The foods mentioned by mothers varied widely and included a variety of commonly available vegetables, green leaves, fish, carrots, meat, and the more expensive oranges and grapes. The foods that were mentioned as good for children by the men and the elderly women were similar to those mentioned by the younger women, but few men provided responses.

Fish was considered to be good for children at all sites whereas meat was mentioned by fewest in the urban slum area. Cheap and easily available yellow pumpkin was not mentioned by any respondent although the yellow vegetable carrot, which is more expensive, was mentioned by many. Commonly available fruits such as banana and papaya were not mentioned at all at the estate setting. Respondents were able to give reasons why certain foods were thought to be good (Table 5.4). A number of women explained the importance of specific foods or food types (e.g., dark green leafy vegetables were considered good for sight and skin color) whereas most said that animal foods such as meat, fish, and liver were good for blood formation. Fruits were mentioned by some as producing a good skin and as preventing constipation (Table 5.4).

Most respondents were of the opinion that there were foods that are bad for children and mentioned an unexpectedly long list of such foods. The concept of heaty and cooling foods is prevalent across all population groups interviewed. Meats—especially beef and pork and some of the common fish (tuna; *balaya,* which is similar to tuna; and *kumbalawa,* which is similar to mackerel)—were considered heaty and thus bad for children. *Kiri ala* (a common yam found in the rural areas) and bread fruit are considered heaty. These beliefs were more common in the estate population and the older women. Heaty foods are believed to cause skin eruptions. Mothers and some older women were reluctant to give acidic foods (tomatoes and pineapple) to children because these foods are believed to cause skin rashes, itching, and cough. Often foods that have a sour taste or an acid taste are referred to as acidic food. Many of the common vegetables such as okra, eggplant, spinach, mung bean, lima beans, common fruits such as sour plantain, and king coconut water were believed to be cooling and not good for children because they cause phlegm. Oily foods and fried foods were withheld from children until they were 24–36 months old because these foods were believed to cause indigestion and stomach puffiness. The men and the older women held views similar to those expressed by the mothers and specifically mentioned that heaty food was bad for children (Table 5.4).

The focus group discussions confirmed the views expressed in the in-depth interviews, highlighting that the many commonly available foods identified as good for children were withheld from children below age 2 years. The range of foods mentioned as being not suitable, however, was very wide and some foods were mentioned by only a few women. Younger mothers said they did not feed their young child acidic, heaty, or cooling foods because they wished to avoid conflict with their mothers or mothers-in-law, although health care providers had told them these foods can be given to children. Focus group discussions highlighted that it was common to withhold some foods for short periods of time during illnesses. Even mothers who disregarded the heaty and cooling concept of foods when the child was not sick did not give cooling foods when the child had a cold or heaty and acidic foods when the child was ill with fever. Many people said oily foods were not given to young children because such foods were bad for them. Few mothers in the focus group discussions said that they fed young children the same foods eaten by adults. These practices were similar to those reported for pregnant and lactating women by Liyanage and Wikramanayake (1984) and Karaliedde et al. (1982).

Besides foods categorized as heaty, cooling, or acidic, there were other foods that were not considered very good for young children. In all areas, cooked jack fruit and ripe jack fruit were said to cause indigestion. Manioc too was not thought to be good for children below age 5 years. Guava, a relatively inexpensive fruit commonly available in most rural areas, was considered bad for children younger than 5 years. In Kalutara, meat was said to be bad for children below age 6 years. Wood apple, a fruit readily available in the dry zone for most parts of the year, was not considered good for preschool children. In Colombo, *dhal,* a commonly used pulse known as poor man's meat was observed to cause puffiness of the stomach and, therefore, was to be avoided for small children. The urban slum participants mentioned that excessive amounts of green leaves caused diarrhea in preschool children.

The knowledge that lack of certain foods may lead to a disease state was not common among the respondents, but a few mothers displayed limited knowledge (e.g., small fish and milk are needed for bone growth; lack of green leaves may cause poor vision, lack of blood, and skin diseases; and not eating meat, fish, and eggs may result in

Table 5. 4. Association between food and health[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Association exists	+++	+++	+++	+++	+++	+++	+++	+++
How								
Good nutritious food makes the body grow and gives strength	++	++	+++	0	++	+++/+	++	++
Foods that are not good for children if given may cause disease	+	+	+	++	+	0/+/++	0	+
If food is not prepared cleanly it may cause disease	+	+	+	+	+	+/++	0	0
Foods that are good								
Green leaves	+++	++	++	+++	++	+++/++	+	++
Fish	+++	++	+++	++	++	+++	++	++
Meat	+	++	++	++	++	+++	++	++
Pumpkin	0	0	0	0	0	0	0	0
Carrots	++	++	++	++	++	+++	++	++
Plantain or banana	++	+++	++	0	++	+++	+	++
Papaya	++	++	++	0	++	+++	++	++
Potatoes	++	+	++	+	+	++/+	+	+
Oranges	+	+	+++	0	++	+/+++	0	++
Eggs	+	+	++	+	+	+++	+	+
Milk	+	+	+	++	+	+++	+	+
Grapes	+	++	+	0	+	++/0	+	+
Beneficial actions of foods								
Dark green leafy vegetables and carrots good for sight and skin color	++	++	+++	+	++	+++	0	0
Animal foods—good for blood	++	++	+++	++	++	+++	0	0
Fruits good for skin and prevents constipation	++	++	++	0	++	++	0	0
Foods exist that are bad for children	+++	++	+++	+++	++	+++	++	++
Foods that are bad for children								
Heaty foods[c]	++	++	++	++	++	+++	++	++
Meat (beef and pork)	0	+	+	+	+	++	+	+
Acidic foods[b]	+++	++	+	++	++	+++/++	+	+
Cooling foods[d]	++	+	++	++	++	+++/++	+	+
Oily or fatty foods	++	++	++	++	++	+++	0	+

Table 5. 4. Association between food and health[a] (continued)

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
The way foods affect health								
Heaty foods cause skin eruptions	+	+	++	++	++	+++	0	0
Acidic foods cause skin rashes, itching and cough	+++	+	++	+++	++	+++	+	+
Cooling foods cause phlegm and colds	+	+	+	+	+	++	+	+
Diseases caused by lack of certain types of food								
Don't know	+	++	++	++	++	++	+	++
No	+	+	++	++	++	++	+	+
Yes	++	+	+	0	+	++	+	+
Diseases caused by excess of certain foods								
Don't know	+	+	+	0	+	++	++	+
No	+	++	+	++	++	+	++	++
Problems caused by lack of specific foods								
Not eating eggs, meat and fish causes lack of blood	+	+	0	++	+	+	+	0
Not eating green leaves causes skin diseases, poor vision, and lack of blood	+	+	+	+	+	++	+	0
Small fish and milk needed for bone growth	+	+	+	0	+	+	+	0
Lack of iodine causes goiter	0	0	0	0	0	++ at two sites	0	0

[a] 0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.
[b] Acidic foods: tomato, pineapple, tamarind, lime, and lemon.
[c] Heaty foods: tuna fish, tinned fish, prawns, cuttlefish, beef, pork, eggplant, breadfruit, and chocolate.
[d] Cooling foods: cucumber, lima bean, ash gourd, mung bean, drumstick, spinach, avocado, and sour plantain.

lack of blood). A fair number of respondents thought that no illness was caused by excess food, but the opposite view that illnesses were caused by excessive food was also common. Few of the men volunteered information on the association between food and illness (Table 5.4), but on the whole the views of the men and the older women were similar to those expressed by the younger women.

Association between Food and Blood

Most participants knew that there was an association between food and blood but many could not explain why. Some mothers made statements such as "blood is related to strength," "if blood is good then health is good," "if blood is clean then health is good," and "lack of blood causes weakness of the body." Even fewer men and grandmothers tried to explain the association (Table 5.5).

Two types of changes in blood were identified: lack of blood or a decrease in amount of blood, which was associated with lack of good food for blood formation, and thinning of blood, watery blood, or blood turning bad, which referred to a change in the quality of blood. Changes in the quality of blood were also sometimes attributed to food, but illness, helminth infections, fear, and unhappiness were believed to cause a change in the quality. A few persons identified germs in blood as a condition that may change the quality of blood. Some respondents in Anuradhapura named malaria and thalassemia—two conditions seen in this locality—as causing thinning of blood. Leukemia was mentioned by very few as a cause of thin blood.

Focus groups also said that good food was needed for the formation of blood. Green leaves, meat and fish, eggs, milk, and liver were identified as foods that improved blood (Table 5.6), but many participants did not know how. Foods bad for blood were the heaty and acidic foods. Acidic foods were believed to cause a deterioration in the quality of blood (burning blood). Heaty foods were believed to cause itching and skin rashes because they turn the blood bad. Some foods were believed to cleanse blood (e.g., bitter gourd, carrots, beetroot, and *gotukola* [a commonly found edible green leaf]). Measures to improve blood were identified as consuming good food, taking vitamins, and seeking medical advice. (Vitamin is used to refer to any micronutrient tablets, syrups, or tonics bought from a pharmacy or given free in a clinic. These may be prescribed by a health care provider or bought over the counter without a prescription.)

Association between Blood and Health

The terms *maandama* and *mandaposhanaya* were used to describe anemia and undernutrition (Table 5.7). Many people did not appear to distinguish between undernutrition and anemia, and both were attributed to a lack of good food. The term *paanduwa* was used to describe a pale person with a puffy face, a symptom encountered often a few decades ago when severe hook worm anemia was common in the country. This may in fact be based on the observations in the community that the prevalence of anemia is high in those with undernutrition. Anemia was not perceived to be a problem in children, especially those less than age 2 years. Young women recognized anemia to be a problem in childbearing women. Most men and grandmothers did not know which population group was most affected.

Anemia was said to be caused by a lack of nutritious food. A few respondents thought that illness might play a role. Poverty was discussed as a cause of anemia during the focus groups but was not mentioned during the individual interviews. Helminthiasis as a cause of anemia was discussed by some of the focus groups more than by others. These were in localities where soil-transmitted helminth infection was known to be common (Table 5.7).

Most health care workers said that they considered anemia to be a significant public health problem in their area. When asked to identify age groups in which they thought it was a problem, all identified pregnant women, women of child-bearing age, and adolescents. No one reported anemia to be a problem in men. Only one respondent reported that she considered it to be a problem in children aged 1–5 years. Some of the doctors agreed that this may be because they do not specifically look for anemia in young children.

Anemia was attributed to poverty and helminthiasis by most health care workers. Even when resources were available, lack of knowledge about nutritious food was thought to contribute to anemia. Only two of the midwives interviewed identified malaria as a problem although malaria is endemic in one of the study areas. In an area bordering the conflict zones, anemia was attributed to lack of proper toilets and helminthiasis. In the slum areas around Colombo, poverty was thought to be the main contributor. In this setting, alcoholism in the fathers was said to aggravate poverty.

According to the health workers, mothers were concerned about failure to gain adequate weight but did not identify anemia as a specific problem. Whenever a child or woman was diagnosed as having anemia, questions would be asked about the problem of anemia. Not many respondents knew about prevention of anemia.

It is important to note that most of the medical officers did not perceive anemia in infants and preschool children to be a problem. Three respondents conceded that this might be because they were not looking for it specifically. The preceding means that there is underdiagnosis of the problem. The community perception that anemia is not a problem in infants and preschool children may reflect the underdiagnosis. The perception stated by the doctors was very similar to that expressed by the field health workers.

Table 5.5. Association between food and blood[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Association exists	+++	+++	+++	+++	+++	+++	+++	++
How								
Blood is related to strength	+	0	+	+	+	+	+	0
If blood is good health is good	+	+	+	0	+	+	+	+
If blood is clean health is good	+	+	+	0	+	+	+	+
Lack of blood causes weakness of body	+	+	+	+	+	++	+	+
Changes in blood								
Lack of blood (decrease in amount)	+++	+++	+++	+	++	+++	++	+
Watery blood or thinning of blood (change in quality)	++	+	++	+	++	++	+	+
Blood turning bad (change in quality)	+	+	+	+	+	+	0	+
Reasons for change								
Food is related to amount of blood; lack of good food causes lack of blood	++	++	++	+	++	+++	+	+
Illness, helminth infection, fear and unhappiness causes thinning of blood	+	++	++	0	+	+	+	+
Acidic food burns the blood	++	++	++	++	++	+++	0	+
Heaty foods makes the blood bad	++	+	++	+	++	++	0	0
Germs in blood	+	+	+	+	+	++	0	0

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Table 5.6. Measures to improve blood[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Foods that improve blood								
Green leaves	+	++	+++	+	++	+++	+	+
Meat and fish	++	++	++	++	++	+++	++	++
Eggs	+	+	+	+	+	+++	+	+
Milk	++	+	+	+	+	++	+	+
Liver	++	+	+	+	+	+++/0	+	+
Bitter gourd – cleans blood	0	0	0	0	0	++	0	+
How the food improves blood is not known	++	++	++	0	++	++	+++	+++
Foods that are bad for blood								
Foods considered acidic burns blood	++	++	++	++	++	+++	+	+
Foods that are heaty makes blood bad	++	+	+	+	++	+++	+	+
Measures to improve blood								
Good food	++	+	++	+	++	+++	+	+
Vitamins	+	+	+	++	+	++	+	+
Medical advice	+	+	+	++	+	+++	+	+
Yes, there are foods that affect blood	+++	++	+++	0	++	+++	++	++

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Table 5.7. Association between blood and health[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Names used in the community								
Maandama (Sinhalese) or *sogai* (Tamil) (marasmus)	++	++	+	+	+	++	+	+
Mandaposhanay (Sinhalese) or *ratta sogai* (Tamil) (undernutrition in general)	+	+	++	++	+	+	+	+
Paanduwa or *pippaanduwa* (pale with puffy face)	+	+	++	0	+	+	+	+
Don't know	+	+	+	+	+	0	+	+
Among who is anemia a problem								
Children not mentioned	+++	++	++	+	++	+++	++	+
Common in childbearing women	++	++	++	++	++	+++	0	+
Some groups only	+	+	+	+	+	+++	0	0
Don't know	+	+	++	0	+	+	+	+
Causes								
Lack of nutritious food	+++	++	+++	++	++	+++	++	+
Illness	+	0	+	+	+	++	+	0
Helminthiasis	0	0	0	0	0	++	0	0
Poverty	0	0	0	0	0	+++	0	0
Signs and symptoms of anemia								
Pallor in general	++	++	+++	+	++	+++	+++	+++
Lethargic, inactive, or sleepy	+++	++	++	+	++	+++	+	+
Pale conjunctivas	++	+	++	++	++	+++	++	+
Pale lips	+	0	+	++	+	++	++	+
Thin, wasted appearance	+	+	+	0	+	+	+	+

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+.

Signs and Symptoms of Anemia

Most respondents identified generalized pallor as a symptom of anemia. They also recognized lethargy, inactivity, and being sleepy as symptoms of anemia. Pale conjunctivas were mentioned by some of the younger women and men but very few of the older women identified this as a symptom of anemia. Pale lips were mentioned by relatively fewer respondents. A thin, wasted appearance was described as a symptom of anemia by a few (Table 5.7).

Pica, being off food, and a protruding abdomen were symptoms of anemia discussed during focus groups but not mentioned in the in-depth interviews.

Treatment and Prevention of Anemia

Most mothers but not men or older women said that they would take their child to the doctor if they thought the child was anemic (Table 5.8). Nutritious food was the commonest form of treatment mentioned by mothers whereas only a few men and fewer older women thought of food as a treatment. Blood transfusion ("giving blood") was mentioned as treatment by some mothers and was the method of treatment most often mentioned by men. Older women were aware of blood transfusion as a method of treatment and a few said that they did not know about treatment. Taking vitamins for treatment of anemia was advocated by some respondents. (Here too the term vitamin was loosely used to include iron preparations.)

Most respondents were aware that anemia could be prevented. Nutritious food figured most prominently in the prevention of anemia. Taking vitamins (including iron) was not considered to be an important preventive activity; only a few respondents mentioned it. Regular deworming was mentioned by a few during the individual interviews, but it was mentioned as an important step in preventing anemia during focus group discussions. Some respondents thought that it was not necessary to give supplements to prevent anemia if good food was available, but many also thought the opposite (Table 5.8).

Primary health care workers reported that often the course of action taken when a child was ill was to take the child for medical treatment. For young children this would be to a Western medical facility. Mothers would often ask for a tonic or vitamin to increase food intake, complaining that the child was off food. Lack of appetite was also attributed to worms, and mothers would either tend to deworm children at regular intervals or whenever the child had a loss of appetite. The health care workers reported that people do not come and ask for treatment specifically for anemia. This is because they seem to attribute the symptoms of anemia to malnutrition rather than perceive it as a separate problem.

In addition to treatment from the doctor, primary health care workers said mothers would also resort to tying a thread to ward off evil and making vows and offerings to their gods. There are also Ayurvedic medications that can be bought in any boutique or shop and are given to children for helminthiasis. Mothers may also resort to home remedies such as cooked *erabudu* leaves. This practice is more common in the rural setting.

Most health care workers believed that if a doctor advised the mothers of the need for a supplement, they would purchase this for their children. A few, especially in the urban slum areas, thought that although a mother was willing to buy a supplement, she might not be able to afford it. A syrup was thought to be the preferred method of treatment and the field midwife or the field clinic was thought to be the preferred source.

Pharmacists expressed similar ideas. People did not ask for medication or vitamins to improve blood. They often asked for a syrup or vitamin to improve the appetite of the child. Most parents were concerned about children's lack of appetite or difficulties in feeding. People would often ask for antihelminthic drugs, but pharmacists would dispense these only if there was a prescription. (This response may be because it is illegal to dispense without a prescription. The reality is probably quite different.)

Attitudes toward Iron Supplementation

Very few women reported they had ever had anemia, which probably shows they were not checked for anemia (Table 5.9). (Mudalige and Nestel [1996] reported that 38.6% of women in the childbearing age group were anemic.) Most of the women said that during their pregnancy they had taken tablets to improve blood; these tablets usually had been prescribed by the doctor or the public health midwife at the antenatal clinic. Only a little more than half of those who had taken the tablets could name them as iron tablets and the responses differed by location, which may reflect the information women are given when the tablets are issued. Very few women reported side effects of the tablets. The side effects reported were nausea, feeling faint, constipation, and a rusty taste. Almost all mothers participating in the focus group discussions said that they had taken tablets to improve blood although only very few admitted to being anemic. Most focus group participants knew that the small brown tablet given in the antenatal clinics was an iron preparation (Table 5.9).

Most of the women interviewed said none of their children had ever been diagnosed as having anemia. This means that a doctor or other health care provider had not said that the child was anemic, perhaps because anemia had not been actively looked for. Nevertheless, about one-half of the women said they had given a supplement to their children to improve their health based on the advice of a doctor. Usually, a vitamin syrup had been given (Table 5.9).

Similar sentiments were expressed during the focus group discussions. Most people felt that it was unneces-

Table 5.8. Treatment and prevention of anemia[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Treatment								
Take to doctor if child is anemic	++	+++	+++	++	++	+++	0	0
Nutritious food	+++	++	++	++	++	+++	+	+
Blood transfusion	+	++	++	+	++	++	++	++
Vitamins[b]	+	++	++	++	++	++	++	+
Prevention								
Anemia preventable	+++	++	++	+++	+++	+++	+++	+++
How								
Nutritious food	++	++	++	++	++	+++	++	++
Vitamins	+	+	+	0	++	++	+	+
Regular deworming	0	0	0	+	+	+++	0	0
Not necessary to take supplement to prevent anemia	+	++	++	+	++	++	+	0
Necessary to take supplement to prevent anemia	++	++	++	0	+	+++/++	0	0

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.
[b]Iron is seen as a vitamin.

sary to give a supplement if good food was given, but many people had given vitamin syrups to their children on the doctor's advice. Children are taken to a doctor because they are not eating well and are prescribed a vitamin to improve appetite. This is usually given for a short period, often until the bottle is empty (less than 1 month).

Decision-making for Seeking Health Care

In the urban and rural sectors, the mother is the key person in the decision-making that influences behavior during illness. On the estates very few mothers said that they made such decisions and more fathers appear to be involved; about one-third of the young women and men said that fathers made the decision whereas a few said that both parents were involved. Mothers, mothers-in-law, and the fathers were the persons most often consulted according to most of the younger women. Few older women indicated that seeking advice from an older family member is a usual practice. Although advice is sought from older members of the family, such advice is followed by few people (Table 5.10).

The finding that mothers were the key decision-makers when a child falls ill was confirmed during the focus group discussions. During discussions men said that the mother had the responsibility for making decisions because they knew best about young children and were the most likely to be the first to notice any changes in a child. Although money is a constraint, mothers would often attempt to borrow what was needed from a neighbor or close relative; advice was often sought as a prelude to borrowing.

Almost all respondents, including all men interviewed, agreed that fathers had very little responsibility about deciding to take or actually taking a child to the well-baby clinic. This was regarded as the mother's responsibility. Constraints to taking the child to the clinic were identified as the mother being ill or having other work to do (Table 5.10).

Health Care Options and Use

Most women selected a government facility for treatment of illness in children(Table 5.11). They said that they would take the child to a private practitioner for some illnesses but that this did not happen often. Nearly half the women would try home remedies first, but the overall practice was to take the child to a Western-qualified practitioner for treatment when ill. The government facility was often selected because it was close and convenient, the service was free, and people had confidence in the diagnosis and treatment. A child who did not respond to treatment from a private practitioner would be taken to a government facility where specialist attention is available. These practices were confirmed during the focus group discussions. Ayurvedic remedies were used commonly in children only to treat or prevent *rathe*. Most respondents sought help from occult or religious practices for illness. These practices were not resorted to as an only means of treatment but were often carried out concurrently with medication and were believed to enhance the effects of the treatment and reduce the duration and severity of the illness. Older women expressed views similar to those of the men.

Sources of Iron Supplements

Most respondents said that if a child needs to be given an iron supplement, the decision to purchase is made by the mother whereas a minority said that both parents are involved in the decision-making. Lack of money was a major constraint identified, but mothers stated that if a doctor prescribes an iron supplement as being essential to the child, they will somehow try to purchase it. Very few stated an amount they were willing to spend: a few said that they were willing to spend about Rs. 100 (US$ 1.5) per month and fewer said that they would spend up to Rs. 500 (US$8)

Table 5.9. Personal experience of anemia[a]

Topic	Colombo (n=20)	Kalutara (n=21)	A'apura (n=20)	Estates (n=27)	All (n=88)	Focus groups young women (n=4)
Mother has been anemic	+	+	+	0	+	+
Have taken tablets to improve blood	+++	+++	+++	+++	+++	+++
Tablets taken on advice of health worker doctor/midwife	+++	++	+	++	++	++
Place of obtaining tablet—clinic	++	+++	+++	+++	+++	+++
Able to identify tablets as iron	++	+++	+	+	++	+++/++
Had side effects when using tablets	+	+	++	0	+	0
Anemia in their children						
No child has been anemic	++	++	+++	++	+++	+++
Have given supplement to improve health of child	+++	++	++	+	++	++

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+.

(Table 5.12).

The purchase of a supplement was discussed at length during the focus group interviews. Although most mothers were ready to purchase a supplement if it was thought necessary by a doctor, constraints of money—especially for prolonged supplement use—were a great concern. It appears that although mothers may be willing to purchase a supplement, the money available for a family may limit the actual purchase. Under these circumstances the actual dosage might not reach the child because mothers would try to make what is available go a long way. In the focus group discussions in Colombo, there was opposition to the idea of purchase of a supplement. It was felt that if money was available it would be better to buy good nutritious food rather than supplements.

Most respondents preferred to obtain a supplement from a government facility. The well-baby clinic was preferred by most but some thought it would be convenient to obtain a supplement from the midwife. The reason for preferring the clinic may be because what is given in the clinic is usually free. In the focus groups in Colombo the idea that it might be more convenient to buy a supplement from the pharmacy was expressed. This is because a supplement could be purchased when money was available and in quantities affordable at time of purchase; such adjustments in purchasing could not be made if the supplement had to be bought from either the clinic or hospital (Table 5.12).

Most mothers preferred a red syrup. Syrups were thought to be easy to give children, and a sweet taste was preferred. More than half the mothers thought that it might be possible to give the supplement daily and were prepared to go on giving it for as long as the doctor thought it was necessary. A few admitted that they might forget to give it daily. The general consensus of focus group discussions seem to be a preference for syrups (Table 5.13).

A few women agreed that the addition of a supplement to the child's plate of food was possible but more felt that the child might not get the total amount given per day if this method was used. Similar concerns were expressed during focus group discussions. Some expressed the concern that when a powder is added to food, some of this may be wasted because children often left food on the plate. This was partly because mothers usually served a little more than what they knew the child would eat in the hope that the child would consume the extra food that was served. A few mothers expressed the idea that the powder could be added to the first few mouthfulls so that all the supplement would be taken in by the child. A mother who has more than one child to feed may often feed them off the same plate. This would also make it difficult to ensure that a child consumes a certain quantity of the supplement.

Child Feeding Practices

Breast-feeding is initiated by almost all mothers, but few exclusively breast-fed only up to age 3 months and about one-fourth breast-fed only up to age 4 months (Table 5.14). The practice of giving *rathe kalke* during early life was not seen as contradictory to the practice of exclusive breast-feeding because this was a medication. Most mothers knew that it was not necessary to give water to a breast-fed infant but some mothers did this, especially in Anuradhapura, which is in the dry zone of the country .

Reasons given for introducing formula feeds were insufficient milk or the mother having to return to work. The mother's return to work was very marked in the estates sector, where nearly all mothers gave this as the reason. Few mothers ask a doctor before starting formula feeds and very rarely have they asked the public health midwife. About one-third of the mothers started complementary feeding by age 4 months, especially in the estate sector (Table 5.14), where most mothers reported starting complementary feeds after 6 months.

Most mothers said that they received advice on feeding young children from a doctor or the public health midwife. This probably refers to the routine advice given at the well-baby clinic. Most mothers prepared the babies food fresh, most prepared it twice daily, and food was given to children only twice daily. Three meals per day from what is prepared for the family is given after 1 year by about one-third of respondents; this proportion increased to about one-half by age 18 months. Thus most children do not get three meals every day by the end of the first year, as advocated by health care providers (Table 5.15).

The focus group discussions confirmed the above findings. The discussions showed that much of the time what was given as complementary feeds was a watery rice *conjee* or a watery soup. Quantities given were often very small. It appears that semisolid food is introduced late, some times as late as after age 1 year. Although a variety of foods are given, each is given in a small quantity. Another feature of feeding noted during discussions was that most of the complementary foods are often given during the first half of the day, with very few foods being given in the afternoon. This is probably because there is no habit of eating a solid meal between lunch and dinner. In the instances where a third meal is given to a child, there appears to be a belief that this should be given before dark. This may be because in the absence of electricity for lighting, much of the routine household work needs to be completed during daylight.

Children are usually fed food on their own plate but at times may eat from an adult's plate, and they are most often fed by their mother. When the mother is not available, the child may be fed by another adult, usually a woman, such as an aunt or grandmother or sometimes even by an older sister (Table 5.15).

Table 5.10. Decision-making for seeking health care[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Key person in decision making								
Mother	++	++	+++	+	++	+++/++	++	+++
Father	+	+	+	+	+	++	+	0
Advice sought from others	++	+++	+++	+	++	++	++	++
From whom								
Mother or mother-in-law	++	++	+++	++	++	+	+	+
Father of child	+	++	++	++	++	++	+	+
Advice followed	+	++	++	+	++	++/+	+	+
Routine clinic visits								
Mother decides to take child	+	+++	+++	+++	+++	+++	+++	++
Mother takes child	++	+++	+++	++	+++	+++	+++	++
Constraints to clinic visits								
Illness in mother	+	+	++	0	+	++	+	+
Mother has other work	+	+	++	0	+	+	+	+
Illness in child	+	+	+	0	+	+	+	+

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Table 5.11. Health care services used for childhood illness[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Services used in illnesses of children								
Government hospital	+++	+++	+++	+++	+++	+++	+++	+++
Private practitioner for some illnesses	++	++	+	+	+	+++	+++	+++
Home remedies	+	++	+++	++	++	+++	0	0
Auryedic practices (*rathe kalke*)	++	++	++	+	++	++	++	++
Other concurrent occult or religious practices	+++	+++	++	+++	+++	++	+	++
Service most often used								
Government hospital or clinic	++	++	+++	+++	+++	+++/++	+	++
Private practitioner	+	+	+	0	+	++/++	+	+
Reason for choice								
Clinic is close and convenient	0	0	0	+++	+	+	0	0
Government treatment is free	+	+	++	0	+	++	+	+
Confidence in government facility	+	+	+	0	+	+	+	+
Diagnosis reliable in government facility	+	+	++	0	+	+	+	+
No waiting at private practice	+	+	+	0	+	++	++	+

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Table 5.12. Purchase of iron supplements[a]

Topic	Colombo young women (n=20)	Kalutara young women (n=21)	A'apura young women (n=20)	Estates young women (n=27)	All young women (n=88)	Focus groups young women (n=4)	Men, interviews + focus groups (n=27+4)	Older women (n=23)
Decision to purchase								
Made by mother	++	++	++	+	++	+++/++	+++	++
Made by father	+	+	++	0	+	++	+	+
Made by both	+	+	+	+	+	++	+	0
Willing to purchase	++	+++	+++	0	++	+++	++	0
Willing to purchase if anemic only	+	++	++	0	++	++	++	+
Amount of money willing to spend per month								
Cannot afford	+	+	+	0	+	++	+	0
Rs. 100 ($1.5)	0	+	+	0	+	+++	0	0
> Rs. 101–500 ($1.6–7.8)	+	+	+	0	+	++	+	0
> Rs. 501 (> $7.8)	+	+	+	0	+	0	+	0
Factors affecting purchase								
Will somehow get if doctor prescribes	++	+	+	+++	++	+++	+	+
Lack of money	++	++	++	0	++		++	++
Where should it be made available								
Well-baby clinic (Ministry of Health)	++	+	+	+++	++	++	++	++
Public health midwife	+	++	++	0	+	++	++	+
Pharmacy	++	+	+	0	+	+/+	++	+
Government hospital	0	+	0	0	+	+	+	+
Reasons for preference								
Clinic visited often and it is free	++	0	0	++	+	++/+	+	0
Public health midwife easy to meet, reliable and free	+	++	++	0	+	++	0	0
Pharmacy convenient as it is open any time	0	0	0	0	0	++/+ Mainly Colombo	0	0

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Table 5.13. Type of iron preparation preferred[a]

Topic	Colombo (n=20)	Kalutara (n=21)	A'apura (n=20)	Estates (n=27)	All (n=88)	Focus groups (n=4)
Type of formulation						
Syrup	+++	++	+++	0	++	+++/++
Powder to be added to food	+	+	+	0	+	++/+
Color preference						
No	++	+	++	0	++	+++/++
Yes	+	++	++	0	++	+++/++
Red	+	++	++	0	+	++/0
Pink	0	+	+	0	+	+/0
Reason						
Syrup easy to give children	+	++	++	0	+	+++/++
Heard of tonic	++	+++	++	0	++	++/+
Do not know the difference between tonic and syrup	+	++	+++	0	++	++/+
Preference for taste						
Yes	+++	+++	+++	0	++	+++
Sweet taste	++	+++	+++	++	++	+++
Ready to give daily	+++	++	++	0	++	+++/++
Duration—as long as doctor says	++	+	++	0	+	++/+++
May forget to give daily	+	+	+	0	+	++/+/0
Difficulties or problem in giving						
Yes	+	+	++	0	+	++
No	++	++	++	0	++	+++
Side effects	+	+	+	0	+	+

[a] 0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

Discussion

The importance of food in maintaining health was a widely prevalent concept, with many study participants being able to identify the interrelationships among food, poor environment, infection, and ill health. Although knowledge related to the nutritive value of common foods is present, practice is influenced to a large extent by humoral theory and the locally prevalent concepts of heaty and cooling foods. Certain foods were seen as good for children and also as good for blood, but there was no sense of specific food components and a lack of certain foods was not widely seen to lead to certain illnesses. Knowledge related to specific deficiency states was limited.

Lack of blood was recognized as an illness with symptoms corresponding to anemia. However, many respondents did not perceive anemia as a specific health problem even though they were able to identify the importance of diet in relation to the symptoms that they attributed to anemia; they did not seem to consider anemia to be an entity independent of undernutrition. The signs and symptoms of anemia were well recognized by most people in the community. Very few respondents attributed anemia to worms or malaria even in an area where malaria is endemic. Lack of nutritious food was identified as the cause of anemia.

One of the important findings of the study is that heath care providers and the general public did not perceive anemia as a problem in young children. This needs active intervention before any anemia prevention program can be launched successfully. Infant and child feeding practices—especially those related to introduction of complementary foods—need improvement, with special emphasis on the importance of quantity and quality of food given to infants and young children. This study's findings suggest that providing knowledge alone to mothers may not be sufficient to improve feeding practices.

Good food figured prominently in the discussions on promoting and maintaining health as well as preventing and treating anemia. The findings suggest that parents would prefer to buy good food than buy medicine. The logical approach in this background may be to consider fortification of a commonly consumed food. In infants and young children the quantity of fortified food consumed per day may limit the usefulness of such an intervention, although improvements in maternal anemia through fortification may indirectly reduce the problem of anemia in infants in the long term. This approach therefore has limited usefulness in addressing the immediate problem.

The importance given to good food could be used in promoting iron supplementation if the supplement is perceived as improving the quality of the plate of food. The notion of giving a vitamin to improve growth was found to be highly prevalent in the communities studied and could be built on to motivate mothers in the initial use of a

Table 5.14. Infant feeding practices[a]

Topic	Colombo (n=20)	Kalutara (n=21)	A'apura (n=20)	Estates (n=27)	All (n=88)	Focus groups young women (n=4)
Youngest child breast-fed	+++	+++	+++	+++	+++	+++
Duration of exclusive breast-feeding						
3 months	+	+	+	++	++	+++
4 months	+	++	++	+	+	+++
Formula feeds	++	++	++	+++	+++	+++
From 3 months	0	0	0	++	+	++
From 4 months or later	+	+	+	+	+	+++/++
After 1 year	+	+	+	0	+	+
Reasons						
Insufficient milk	++	++	+	+	+	+++
Mother working	+	0	0	+++	+	+++/+
Advice sought from doctor to give formulae	+	++	+	++	+	+++/++
Commencement of complementary feeding						
3–4 months	++	+++	+	0	++	+++
After 4 months	+	+	++	++	++	+++
Foods given under 1 year						
Rice *conjee* (watery)	++	+++	++	+	++	+++
Vegetable soup	++	++	0	+	++	+++
Fruit juice or fruit	++	+++	+++	0	++	++
Rice + vegetables + fish as semisolid	+	0	0	+	+	++
Potatoes	+	+	+	+	+	++
Egg	+	+	+	+	+	+
Biscuit	+	+	+	+	+	++
Commercial cereal preparations	+	+	+	0	+	+
Can iron supplement be added to child's plate						
Yes	++	++	++	0	++	+++
May be wasted	+++	++	++	0	++	+++/++

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

supplement. In the long term, if benefits could be observed—in terms of better and improved health of infants and young children—such a preparation would be accepted readily by the community.

The addition of a supplement as granules added to the plate of food given to a young child was an alien concept in the communities studied. The suggestion received varied responses. Some mothers thought it to be feasible whereas several pointed out the disadvantages of such an action. The commonest cited disadvantage was wastage of the supplement when food served to a child is left uneaten on the plate. Most mothers expressed a preference for a liquid formulation that could be given to the child after a meal. This may be practical, especially in households where there is more than one young child who is usually fed from a common plate (not from an adult's plate) by the mother or an older female relative.

Consideration of cost to consumers is an important aspect in introducing a supplementation program. Although mothers stated that they were ready to purchase a supplement if a doctor said that the child needed it, the regular and prolonged use would depend largely on the purchasing power of the family. Therefore, cost of the supplement may play an important part in the success of the program, particularly among the poorer segments of society as reflected in the findings for the urban slum dwellers. Cost is most likely to affect families whose need is greatest and a mechanism to ensure good coverage among the poor families in a community may have to be thought of.

The interviews and the discussions highlighted the need to pay attention to the mode of introduction of a program where a supplement is to be added to the normal feeding practices of a young child. The role of the health care provider, doctor, or field midwife and the involvement of the routine well-baby clinics in such a program need careful consideration. It appears that the advice to give a supplement would be best accepted from a doctor rather

Table 5.15. Child feeding practices[a]

Topic	Colombo (n=20)	Kalutara (n=21)	A'apura (n=20)	Estates (n=27)	All (n=88)	Focus groups young women (n=4)
Advice on feeding						
Public health midwife	++	++	++	++	+	++
Doctor	+	+	+	++	+	+
Food freshly prepared						
Yes	++	++	+	+++	++	++
No	0	+	++	0	+	+
Number of times fed per day						
2	+	++	+	++	++	+++
3	+	+	++	0	+	+++/++
4	+	+	+	0	+	+
Age at which child is fed from meal prepared for family						
After 8 months	+	+	0	0	+	++
After 12 months	+	+	+	+	+	+++/++
After 18 months	+	+	+	+	+	++/++
Child served separately	++	+++	++	++	++	+++
Child eats from others plates	+	++	+	+	+	+++/++
Child fed by mother	++	+	++	++	++	+++
Child fed by other adult	+	+	+	++	+	++/+++

[a]0 indicates <10% and no response, + indicates 10–30%, ++ indicates 31–69%, +++ indicates 70%+; in focus groups young women, the / indicate range of variation between the groups.

than a field health worker. The place from where the supplement could most conveniently be obtained varied. The majority chose the well-baby clinic whereas the urban communities thought it more convenient to have the supplement available in a pharmacy or boutique in the area. The well-baby clinics currently provide all services as well as the fortified food supplement (Thriposha) that is given free of charge. The implications of introducing an iron supplement, which has to be purchased, to the well-baby clinics needs to be carefully discussed with all stakeholders.

Thus, overall, these findings indicate that iron supplements would be acceptable socioculturally, especially because mothers are already in the habit of asking for syrups and tonics to improve appetite in young children. Potential constraints are cost and the low priority given to anemia in infants and young children by both health care providers and the lay public. It was also unclear whether the mothers had a clear understanding of the conception of health promotion. In the long term, overall improvement in complementary feeding remains important, especially because of the strong value placed on food in relation to health by people themselves. As some mothers stated, "If we had the money to buy supplements, maybe we could buy better food."

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6: CONCLUSIONS AND RECOMMENDATIONS

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Common Findings

When the findings from the individual countries studies were compared, interestingly and perhaps unexpectedly, many commonalities emerged. General concepts of good health and characteristics of a healthy child were quite similar across countries. In relation to anemia, an illness syndrome relating to lack of blood or blood of an inappropriate consistency was recognized in all countries, although the precise etiology and symptoms attributed to it varied. This illness syndrome was not generally seen as a common problem in young children. Food was seen as very important in maintaining health, and different types of food were seen as good or bad for health. Beyond this, there was little conception, if any, of there being specific components of food, such as micronutrients, that might be health promoting. Patterns of child feeding were variable in terms of the age at which complementary foods were introduced, what was given, how it was prepared, and who was responsible for child feeding within the household. In all countries there was a variety of available health care options, formal and informal; the patterns of resort to these and the factors governing these were variable. These similarities and differences across countries are summarized and their implications in relation to the research objectives listed in Chapter 1 are discussed.

Perceptions of Health

In all study countries the description of a healthy child was quite similar. A healthy child is active, eats well, looks well, and grows well. The definition of what each of these characteristics means varied from country to country but the basic idea was constant. The absence of disease was also mentioned as an indicator in Sri Lanka; in Peru and Nepal being undemanding and letting the mother do her housework were mentioned. The description of an unhealthy child was basically the opposite of these characteristics: not active, not eating well, lacking appetite, not growing well, or presenting symptoms.

The factors that were said to promote health included good food (meaning of good quality or nutritious), hygiene (mainly personal but also environmental), and proper childcare (in most places a broad and slightly diffuse concept that incorporated hygiene and good food in addition to maternal love and attention). Country-specific factors mentioned were the importance of giving medicines (Ghana and Nepal), timely medical attention (Peru), deworming (Sri Lanka), and maternal health status (Nepal). Country-specific causes of illness mentioned were mainly nonenvironmental factors such as *susto* (Peru), a bad spirit (Nepal), and lack of harmony within the family (Sri Lanka), although insects bites were also cited in Ghana. In terms of vulnerability to illness, the only sex difference mentioned was in Nepal, where girls are considered more resistant to illness.

The common factors thought to cause bad health were the opposite of these, that is, poor diet, poor hygiene, and poor childcare.

Association between Food and Health

In all countries food was seen as related to health, providing a source of strength and energy, and necessary for growth in children. It was also considered to protect the child against poor health. In Nepal and Ghana food was also spontaneously cited as necessary for (healthy) blood, but beyond this differences emerged—good food was given different attributes in different places. In Nepal and Peru overall variety was considered important for health. In Peru eating at the appropriate time was also very important. In Nepal needs were seen as being age related, and easily digested foods were seen as being good for small children. In Sri Lanka the humoral concepts of heaty and cooling foods and the need for balance also emerged. Interestingly, although the humoral concept of maintaining balance between hot and cold in the body is important in lay Peruvian medical culture, it does not extend to meal planning; a woman may not give her child an orange in winter because it is a cold food, but when women refer to a balanced diet, the reference is more to what they have heard from health personnel and nutrition messages at community kitchens. No one specific illness was seen to

be caused by lack of any one specific food and there was no notion of specific nutrients in foods, such as iron.

Specific foods classified as being good for health were diverse and reflected local food availability and cuisine. These foods included staples such as rice, *gari* (grated cassava, fermented, dried, and roasted into small grains then reconstituted into a meal by mixing with hot water), *fufu* (made from starchy staples, usually tubers [yam, cassava, and cocoyam] or plantain, boiled and pounded into a soft ball), yam, pulses, green leafy vegetables, fish, fruits, dairy products such as curd, red palm oil, eggs, and meat. Although the pattern of responses showed relative consistency within countries, there was little consistency across countries in relation to particular foods. Both animal and plant foods were cited as good for children, but the specific foods that mothers listed as good for children varied from country to country. Green leafy vegetables were mentioned fairly frequently in several countries (Sri Lanka, Nepal, and Ghana). In Sri Lanka and Nepal it is likely that this may reflect health education messages to reduce vitamin A deficiency, whereas in Ghana it may reflect health education messages to control anemia. Various animal products, such as meat and fish, were mentioned but these foods were usually not given to children, perhaps because of the high cost of these foods.

Functions linked with particular types of food tended to be country specific. For example, food was described as providing good defenses for the child in Peru; in Sri Lanka green leafy vegetables and fruit were seen as good for the skin and animal foods, such as meat, fish, and liver, were seen as good for blood (although some meats and fish are also seen as heaty foods and thus potentially bad for children).

Foods considered bad for children were also country specific. In Ghana raw foods—meaning staple foods given without a sauce, frequently a soup with vegetables, groundnuts, or beans—were considered bad for children. Spicy and fatty foods were considered bad in Peru and Nepal. In Sri Lanka excessive intakes of heaty, cooling, oily, and acidic foods were considered bad for children under age 1 year. As mentioned above, heaty foods include some meats, especially beef and pork, and some varieties of fish and are believed to cause skin rashes. Cooling foods are thought to cause phlegm and include many common fruits and vegetables. Excessive sweets and legumes with skin were also considered inappropriate for small children in Peru and undigestible or stale foods were considered inappropriate in Nepal.

Little association was made in any of the study countries between particular illnesses and lack of specific foods. For example, in Ghana only a few respondents linked shortage of blood with low consumption of *kontomire* (cocoyam leaf), anchovies, and beans; lack of strength with not eating weanimix (a ground and roasted mixture of maize, groundnuts, and fish or beans, which is a carryover from the United Nations Children's Fund's complementary feeding program); poor bone formation with inadequate intake of bones and intestine; and kwashiorkor with inadequate intakes of breast-milk, groundnuts, *agushie* (melon seeds), and fish.

Association between Blood and Health

Blood was seen as a vitally important substance (a source of life and strength) and perceived to be related to health in all settings, but the precise nature of the relationship was conceptualized somewhat differently in each country. Generally, the main problems that could affect blood were associated with quantity (shortage of blood) and consistency (either being too thick or too thin) and to a lesser extent color and purity. These appeared to be seen as clearly separate syndromes with different etiologies in Sri Lanka, whereas in Ghana concern seemed to focus on the quantity of blood, with the main concern being shortage of blood. In Nepal there was concern about both consistency and quantity, but these appeared to be perceived as interrelated qualities and there was also some divergence of opinion about the amount of blood required and whether it is better to have a lot of blood or a little blood. In Peru concern about either quantity or quality of blood was less prominent.

There was some variation in the attributes of the thinness or thickness of blood; in Sri Lanka there was more emphasis on watery blood as being negative whereas in Nepal, although thick blood is associated with health, very thick blood was also not seen as good. Concepts of purity and pollution also emerged in some countries: good and healthy blood were pure blood in both Sri Lanka and Ghana, and in Peru a child's blood was considered healthier or purer than an adult's blood (the blood of an adult being made less pure by illness). The color of blood was important in Peru and Nepal (i.e., blood should be a full or dark red, not pink), but not Sri Lanka or Ghana.

The causes of these problems were primarily linked to the adequacy of food, whatever the local definition. Thus, measures cited to improve blood commonly included food, either increasing consumption of specific foods or improving the overall diet. Foods that were considered good for blood, however, were mostly the same as those thought to be good for health in general. In addition to inappropriate or inadequate food, other causes of blood problems were infections, such as malaria and helminth infections (Peru, Sri Lanka, and Ghana); working too hard in the sun, which uses up the blood (Ghana); excessive consumption of alcohol and drugs (Nepal); and emotions such as fear and unhappiness (Sri Lanka).

In terms of dietary treatment, specific foods thought to improve a child's blood were diverse and included eggs,

fish, beans, *kontomire*, *agushie*, and herbs in Ghana; beetroot, chicken liver, milk, pigeon blood, frog broth, and—in general—meat, vegetables, and cereals in Peru; green leafy vegetables, fruits, meat, milk and curd, red amaranth, eel fish, goats blood with lemon, and eels in Nepal; and nutritious food in general, such as meat, fish, green leafy vegetables, eggs, liver, milk, carrot, cabbage, papaya, and cereals in Sri Lanka. For some of these responses and particularly those about green leafy vegetables, it is possible that women were repeating health education messages. Drugs and vitamins were also though to improve blood in Ghana, Sri Lanka, and to a lesser extent Peru. Protection from mosquitoes and having a household free of quarrels were considered to improve the blood in Sri Lanka.

Foods considered bad for blood range from those considered bad for children in general, such as excess of sweets (Peru), to particular food types such as the staple food without sauce in Ghana; specific foods such as unripe mangoes, tamarind, and pickles in Nepal; and pineapple, tomato, eggplant, lime, manioc, tuna fish, prawns, beef, and pork in Sri Lanka.

In all the countries, foods are thought to have the same effects on all small children without regard to age and sex differences.

Signs and Symptoms of Anemia

The clinical symptoms of anemia generally recognized by mothers in all countries included pallor, loss of appetite, and inactivity of the child. Pica was rarely mentioned. Across countries general pallor was the most generally recognized symptom but there were differences in the sites of the pallor. In Peru and Nepal general pallor particularly of the face and lower eyelids was associated with anemia, in Sri Lanka the lips were also mentioned, and in Ghana pallor of various parts of the body was mentioned. In Ghana the symptoms of pallor were considered to require immediate attention whereas this was not the case in Peru.

In Ghana, Nepal, and Sri Lanka the symptoms described above were attributed first to shortage of blood and next to the consumption of a poor diet, with no notion of it being caused by a lack of specific nutrients or components in foods. There was no local term to describe it in Peru; the medical term anemia was used, which was seen as being due to a lack of food (quality and quantity) in general.

In all countries anemia was recognized as a problem in the community but primarily as a problem in pregnant women; it was not seen as a particular problem of small children, particularly under age 1 year. It is likely that the health professionals interviewed as key informants were referring to severe anemia when they mentioned anemia as a cause of hospital admission or attendance; anemia is often associated with other illnesses when children are brought to health facilities and it is probably these rather than the anemia that are noted as the cause of attendance.

Deficient food and blood always featured among the causes given for anemia. Therefore, in all countries food was seen as the principal way of treating anemia, although some other forms of intervention were seen as a complement to these: vitamins in Peru (where vitamins were thought to stimulate the appetite and so lead to an improved dietary intake, which would cure the anemia) and Sri Lanka; formal medical attention in Nepal, Sri Lanka, and Peru; medicines and tonics in Ghana; and, in extreme cases, transfusions in Nepal, Ghana, and Sri Lanka.

No clear, general concept of prevention existed; in all settings greater emphasis was placed on curative interventions. Still, for anemia, prevention includes giving food and some supplements, considered complementary, depending on the availability of resources to families. Fortified foods were not known.

In summary, food is associated with the causes, treatment, and prevention of anemia at all study sites.

Child Feeding Practices

Breast-feeding is the norm in all of the countries, but the duration of exclusive breast-feeding was low in all places where other liquids, such as teas and animal milks, were introduced at an early age. The age of introducing solid or semisolid complementary foods was approximately 4–6 months in all countries. In Nepal this is initiated with a ritual rice feeding ceremony at age 5 months for girls and age 6 months for boys, but after this breast-feeding is continued. Only when breast-feeding is considered inadequate are semisolid mixed weaning foods given in appreciable quantities. In Peru and Sri Lanka dilute weaning foods, such as soups, were given complemented with semisolid paps or purees. Feeding frequency during the day varied from one to two or three times per day with nibbling during the morning (Peru) or nibbling from already prepared food (Nepal). In both Sri Lanka and Peru little food is given during the later part of the day. If foods were specifically prepared for children, this was mostly only done once each day. If the child was fed more than once, the same preparation might be warmed and served again. In Sri Lanka mothers preferred to prepare foods freshly for young children under age 1 year, which, because of time constraints, meant that most were only able to give two meals per day, usually in the first half of the day.

In each country the amount of the child's food selected from the family diet varied; in Ghana and Nepal there was more family food given but in Peru and Sri Lanka women prepared foods specifically for young children. In general the mother feeds the child; in all countries food was mostly served separately for children in a bowl or plate but food was also given at times from other peoples' plates or bowls. In Ghana older children shared a common

bowl, which can lead to the younger ones not getting sufficient food.

Supplements

There were no overall concerns expressed about giving supplements to children, but supplements may be considered a waste of resources or not necessary when they are given to children thought to be healthy. The actual experience of giving supplements to children was limited in most countries As mentioned above, vitamins were given in Peru, but usually on medical advice. Tonics given in Ghana for blood shortage and loss of appetite were obtained from the drugstore or the hospital. In Nepal only a few mothers had been given supplements and, again, they were given for blood shortage and loss of appetite.

Regarding maintaining a daily dosage, women in Nepal expressed concern over the difficulties of administering supplements daily. They stated that they would prefer a weekly or even monthly dosage but it is possible that these attitudes are influenced by the mass vitamin A supplementation program in which a megadose is given to a child every 6 months and it is emphasized that it is important for the child to participate in all dosing rounds. The women in Peru also expressed concern over the difficulty of maintaining a daily dosage; all women who had given supplements to their child in the past reported forgetting to give the supplement on some days. They were also concerned that not giving the supplements at the same time each day would lead to insufficient dosage. This also emerged as a problem in the small supplementation trial in Peru. Regarding the duration of supplementation, mothers said they were prepared to follow physicians' instructions, although they are usually looking for shorter courses of supplementation.

The most preferred form of supplement was liquid although there was interest in the concept of sprinkles. Similar preferences were expressed in all countries with respect to color, taste (sweet), and flavor (fruity). No consistent preferences regarding color emerged. No concern was expressed about possible side effects, although it must be remembered that these were hypothetical questions.

Again, no consistent preferences emerged regarding distribution channels for supplements. It was felt that supplements could be distributed through the health system—either in the community or at a fixed facility—or through the private commercial sector, reflecting the local availability and access to these services.

Decision-making with Regard to Child Health and Use of Different Health Care Options

For sick children the decision-making process seemed to be linked to the control of resources within the household. Fathers were the main decision-makers in Ghana and Nepal as were mothers in Sri Lanka and Peru. This difference was more likely to have been due to easier access to (and thus less expensive) health care than to mothers having greater control of resources in Peru and Sri Lanka. At the same time, women control few resources in Ghana and Nepal; thus, husbands need to agree to decisions to seek health care outside the home.

Decision-making also seems to be associated with differences in the social status of women and socioeconomic status within each setting. Consultations were usually made with other people, especially when the main decision-maker was absent. However, the final decision was always made by the parents of the child. The decision-making process was slightly different for use of preventive services for children, with mothers being the principal decision-makers, most of whom identified lack of money as a constraint to using such services.

Medical pluralism exists in all countries, and the pattern of resort reported in each country was different. In Ghana the reported first choice was the hospital followed by the herbalist and pharmacy. However, this is not consistent with actual patterns of use and it is probable that the fact that the interviewers were linked with the formal health services in the areas influenced responses to these questions. In Nepal the first choice was the private clinic followed by the local faith healers and then the health post. In Peru the health posts were primarily used for children, but choice also depended on the type of illness. In Sri Lanka the hospital is the major health resource. The reported usage of informal care providers was low in most places, but it is possible that this was biased because many of the interviewers were seen to be linked to the formal health services.

Conclusions and Recommendations

As stated in Chapter 1, the aims of this research project were to explore behavioral and sociocultural factors that may influence the acceptability and use of iron-containing supplements for infants and young children aged below age 5 years. These were investigated in relation to health-seeking behaviors, specifically to the recognition and symptom definition of anemia, lay consultation and referral for child health and sickness, treatment actions if any for anemia (if recognized), and folk dietetics and child feeding practices. The findings on these were used to make country-specific recommendations regarding the suitability of iron supplementation in terms of its sociocultural acceptability and to identify factors that may either promote or constrain their use.

In this chapter the findings of each country study have been drawn together to identify any recurring themes that may exist and to determine whether these can be used

to generate any broader recommendations regarding the sociocultural acceptability of iron (and micronutrient) supplements for infants and young children. For this to be done, an issue that needs to be confronted beforehand is that of generalizability.

From a programatic point of view, lack of generalizability is often seen to be one of the shortcomings of qualitative research. It is also a shortcoming that can create tension between those who plan and implement programs—who want and need the broader conclusions and recommendations to be identified—and the researchers themselves—who will usually assert that their findings are context specific and should not be used to draw such generalizations. To address this issue constructively, it is important to distinguish between empirical and theoretical generalizability (Mason 1996). According to Mason, empirical generalization refers to the process of drawing inferences from the analysis of one study population about the characteristics of a wider population. It is based on the assumption that the study population was statistically representative of the wider population. Because this type of sampling is not usually used in qualitative research and was not used in the studies reported here, this type of generalization would be both inappropriate and unproductive. Theoretical generalization is a more complex process and is more concerned with making key comparisons and developing theoretical propositions, for example, about the nature of certain social processes. As discussed in Chapter 1, each type of generalization tends to be linked with a particular sampling strategy, in this case purposive sampling.

With this distinction, the empirical generalizability of the findings of each country study cannot be extended beyond the specific country context, but the findings are relevant for other similar settings in terms of the wider lessons learned. These relate to the complexity of health-seeking behaviors investigated and raise issues and questions about the overall program direction with regard to anemia in infants and young children.

Conclusions

Although these studies were formative research projects designed to inform intervention choice and program design rather than detailed in-depth ethnographic studies, they both singly and collectively demonstrate the complexity of health-seeking behaviors.

In all the countries in this study there was recognition of a condition associated with a blood disorder in children, which in three countries was seen as a shortage of blood and which was largely linked with dietary causes. The physical signs and symptoms that mothers associated with these conditions in the four countries also corresponded largely to the signs and symptoms of iron deficiency anemia as defined by Western biomedicine. These data should be interpreted with care. Although there is significant overlap, it should not be immediately assumed that the conditions described in the particular country contexts correlate exactly with the medical definition; interpretations differed in terms of the particular accompanying symptoms, etiology, and appropriate treatments. For instance, in Sri Lanka, anemia was not distinguished from general undernutrition.

It is thus a striking and significant finding that despite recognition of a condition corresponding to anemia by both mothers and health professionals involved in service delivery, it was not generally seen as priority health issue in relation to young children. In most of the countries anemia was principally seen as a problem for women of reproductive age by both women themselves and formal health service personnel. Another significant finding is that set within the broader context of health-seeking behavior as a whole, mothers also had little concept of prevention. Greater weight was placed on curative interventions for anemia, of which diet was seen as the most important. In some contexts mothers had given supplements (mostly vitamin syrups) to their children and generally expressed no concerns about giving them, especially if the supplements were medical recommendations. In all countries a liquid form (either syrup or drops) was preferred, but interest was expressed in giving the supplement as sprinkles after they were described. Sprinkles appear to be a viable option in that children were usually but not always given their own serving of food, although foods were not always specifically prepared for them. Where foods were specifically prepared, this was only done once per day, indicating that if sprinkles were to be used they would have to be added to the child's portion just before consumption. However, concerns were also expressed about the child not receiving the full dosage if the full portion was not consumed. Other constraints that emerged concerned ability to administer supplements; remembering to give supplements daily long term, whatever the form of the supplement; and, in relation to preventive health, women's ability to pay.

In relation to child feeding practices and folk dietetics, as mentioned above, the importance of food for health and as a means of correcting illness was greatly stressed in all contexts. Despite some evidence of nutrition education activities for vitamin A (e.g., in Nepal), there were no lay concepts of specific food components with specific physiological functions.

These findings raise a number of programatic issues. The importance placed on food as a whole and the lack of the concept of prevention leads first to the question of whether pharmaceutical micronutrient supplements are indeed the best way forward or whether a broader and more integrated food-based approach would be more ap-

propriate and more effective. Second, these findings also suggest that current health and nutrition education activities focusing on concepts related to preventive nutrition have not been successful and require revision. There is also a challenge in the way in which information is communicated within the field of health promotion, and interest currently exists in the implications of communication theory for the dissemination of health information (MacDonald 1992). Much nutrition education, however, is based on an old-fashioned didactic model of linear communication. This is of debatable validity and is also guilty of what has been called the "fallacy of the empty vessels" (Polgar 1962)—that is, it is often assumed that nothing existed in terms of health beliefs and therapy before the introduction of Western medicine. These studies illustrate the complexity and richness of peoples' beliefs and behaviors and, perhaps, as Nichter and others suggest (e.g., see Nichter and Nichter 1996), information should be formulated in categories that are meaningful to people themselves. This would also support a food-based approach in which a supplement that could be perceived to be and presented as food-based, such as sprinkles, may have a promising role.

Overall, therefore, in terms of program development, this research has uncovered some of the underlying factors that influence how, whether, and why parents administer micronutrient supplements to infants and young children. Further operational research, such as household trials, are needed to assess acceptability of and adherence to iron supplements—be they drops, syrup, or sprinkles—in the long term. Finally, the research questions the appropriateness of focusing on pharmaceutical supplements per se over food-based approaches because the behavioral aspects would appear to be equally complex.

In addition to these lessons, there were also methodological lessons learned. Three of the four research groups involved had no previous experience with qualitative methods and found some aspects of the research process difficult. These could have been addressed more thoroughly in workshops. It would also have been constructive to have discussed the preconceptions and biases of the researchers and field workers within each country, because there were some indications of interviewer bias. The prior experience of the Peruvian group was apparent and their combination of in-depth interviews followed by a survey with a larger sample is a good way to enhance empirical generalizability within a particular country context.

Recommendations

Country-specific recommendations have been made in each chapter, but on the basis of these broad findings, the following general recommendations are made:

- Create awareness of the vulnerability of small children to anemia and its consequences at the community level and in the health system, both formal and informal.
- Specifically promote the concept of prevention so that it is more widely understood and accepted. Because prevention is not necessarily perceived as important by most people in developing countries, this will have to be done if efforts to prevent anemia are to be successful.
- Promote supplements as complementing and reinforcing food. Because food is perceived as being the main cause of as well as the principal means of treating and preventing poor health, including anemia, if given a choice people will prefer to give food over pharmaceutical supplements.
- Consider the mode of feeding and meal patterns of small children when designing pharmaceutical supplement interventions so as to both increase the intake of food sources of bioavailable iron and to maximize the benefit from a pharmaceutical supplement.
- Present iron-containing supplements in a liquid form although other forms, such as a powdered preparation, may be acceptable but need to be tested. Whatever the form, the taste needs to be acceptable to children.
- Determine the appropriate and most acceptable regimen, giving consideration to the concerns about remembering to give supplements daily, the amount to be given, the duration, and the cost involved.
- Explore the potential feasibility of developing a public-private sector partnership to promote and distribute iron-containing pharmaceutical supplements.

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Appendix 1: DRAFT TOPIC GUIDE

The draft topic guide was developed collaboratively at the planning workshop held in London, 1–3 April 1998. The purpose was to identify the particular topics relevant to this research that would be investigated in each country. After the pilot studies this topic guide was modified to suit each country context by dropping or adding new topics as pertinent to each study site. The table below shows which topics or questions were included, included with modification, or dropped completely as inappropriate. This topic guide was intended to serve as a checklist of topics and not as a rigid interview form. It was translated, reworded, and reordered as necessary. I stands for included, M for included with modification, and O for omitted.

Topic	Ghana	Nepal	Peru	Sri Lanka
Concepts of health	M	M	M	M
How do you describe a healthy child?	M	I	M	M
What will tell you that a child is not healthy?	M	M	M	M
What factors promote and maintain good health?	M	M	M	M
What factors cause bad health/illness?	M	M	M	M
Are these factors the same for different age/sex groups?	M	M	M	M
Association between food and health	M	M	M	M
Does the food a child eats affect his or her health?	M	I	M	M
If yes, how?	M	I	M	M
What foods are good for children?	M	M	M	M
Why?	O	I	M	M
What foods are bad for children?	M	M	M	M
Why?	I	I	M	M
Explore different age groups and gender	M	M	M	M
What illnesses are caused by lack of specific foods?	M	M	M	M
Association between blood and health	M	M	M	M
Do you think that there is any association between the state of a child's blood and their state of health?				
If yes, how?	M	I	M	M
What are the things that can go wrong with children's blood?	M	I	M	M
What are these caused by?	M	M	M	M
What are the things one can do to improve a child's blood?	M	M	M	M
Food and blood	M	M	M	M
Does the food children eat affect their blood?	M	M	M	M
If yes, how? (explore concepts of specific nutrients and food components)	M	I	M	M
What foods are good for blood?	M	M	M	M
Why?	M	I	M	M
What foods are bad for blood?	M	M	M	M
Why?	M	I	M	M
Explore different age groups and sex	M	M	M	M

Topic	Ghana	Nepal	Peru	Sri Lanka
Signs and symptoms of iron deficiency anemia	M	M	M	M
How can you recognize when a child does not have enough blood (refer to answers to questions about relationships between blood and health)?	M	M	M	M
Symptom checklist:	I	I	I	I
pale lips				
pale eyes				
pale tongue				
pale palms				
pale nails				
pale face				
loss of appetite				
not playing				
not active				
pica				
puffy face				
failure to thrive				
other				
Do you have a special name for this condition?	O	M	M	M
Is this a common problem in your community?	I	I	M	M
If so, is it more of a problem among particular age/sex groups?	M	M	M	M
Treatment of iron deficiency anemia	M	M	M	M
If iron deficiency anemia is recognized as a problem, how is it treated?	I	I	I	I
Treatment prompt list:	I	I	I	I
foods				
fortified foods				
medicines				
supplements				
blood transfusions				
injections				
other				
Prevention of iron deficiency anemia	M	M	M	M
Do you think that this (use a local name if there is one) can be prevented?	I	I	I	I
If so, how can you prevent it in children?	M	M	M	M
Prevention prompt list:	I	I	I	I
foods				
fortified foods				
medicines				
supplements				
blood transfusions				
injections				
other				
Have you ever used any of these yourself?	M	M	M	M
Which?	M	M	M	M
Did you have any problems with them?	I	M	M	M
From where did you get them?	O	I	M	M
Have you ever given any of these to your children?	O	I	M	M
Which?	O	I	M	M
In what form?	O	I	M	M
Why?	O	I	M	M
On whose advice?	O	I	M	M
Supplements can be used for prevention. What form do you prefer to give to children? i.e., tablets, syrups, tonics, injections, or powders that can be mixed with food?	M	M	M	M
Do you have any preferences for color?	O	M	M	M
Do you have any preferences for taste?	O	M	M	M

Topic	Ghana	Nepal	Peru	Sri Lanka
Explore the above by age group and gender	M	M	M	M
Do you have any concerns about giving supplements to children?	M	M	M	M
If so, what?	M	M	M	M
Are you concerned about side effects in children?	M	M	M	M
If so, what?	M	M	M	M
Is it feasible (practical, necessary, willingness) to give a supplement every day?	I	M	M	M
Would remembering to give it be a problem?	M	M	M	M
For how long would you be ready to give it?	M	M	M	M
Decision-making processes in the household	M	M	M	M
Who decides when a child is ill enough to need intervention?	M	M	M	M
Who decides what to do?	M	M	M	M
How is this decision arrived at?	I	M	M	M
Who is consulted in this process?	M	M	M	M
Is their advice followed?	M	M	M	M
What factors influence this decision?	I	M	M	M
Prompt for:	O	I	I	I
type of illness	O	I	I	I
severity of illness	O	I	I	I
resources available within the household (e.g., financial, social support within/outside household	O	I	I	I
burden on the household, e.g., time, lost income, transport, medical costs, social costs	O	I	I	I
If a child is well and you have to take them to the clinic for weighing, is this process different?	M	M	M	M
What factors influence this decision?	O	M	M	M
Who takes the child?	M	M	M	M
If you have to buy something that is good for your child's health (e.g., vitamins), who decides that?	O	M	M	M
What factors influence this decision?	O	M	M	M
Use of different health care options	M	M	M	M
What are the services/different options available in your area for treating sick children, formal and informal?	I	M	M	M
Which do you use most often?	I	M	M	M
Why?	I	M	M	M
Do you use any of the others?	I	M	M	M
Under what circumstances?	I	M	M	M
Do you use more than one for the same illness episode?	I	M	M	M
Why? (e.g., because one treatment does not work?)	I	M	M	M
Which is the easiest for you to use?	I	M	M	M
Why? (e.g., distance, costs [transport, user charges], waiting times, opening times, staff attitudes)	I	M	M	M
We talked about supplements earlier, for you what would be the best way to supply them?	I	M	M	M
Why?	I	M	M	M
Child feeding practices	M	M	D[a]	M
Focus on what the mother did for her last child:				
Did you breast-feed your last child?	O	M		M
If yes, for how long did you exclusively breast-feed?	O	M		M
If yes, have you given any other kind of milk in addition?	O	M		M
What?	O	M		M
If didn't breast-feed, what kind of milk did you give?	O	M		M
At what age did you regularly introduce foods other than milk?	I	M		M
What were they?	I	M		M
Were they prepared fresh each time?	I	M		M
How often were they given?	I	M		M
By whom?	I	M		M
How were they fed? (i.e., cup and spoon, bottle?)	O	M		M
At what age do children get foods from the family diet?	M	M		M
What are they?	O	M		M
Who serves them?	O	M		M
How is it served? (i.e., do they get a separate serving?)	M	M		M
Who feeds them or supervises?	O	M		M

[a] Questions on child feeding practices were not included in the in-depth interviews in Peru but were included in the survey.

Appendix 2: STRUCTURED INTERVIEW GUIDE

INSTITUTO DE INVESTIGACION NUTRICIONAL

AUGUST 1998

GENERAL INFORMATION

Code _____

Field worker's name _____

Date of interview _____

1. Respondent's name _____

   1a. Relation to index child 1a. ____ ____

   1=mother; 2=father; 3=grandmother; 77=other (specify) _____

2. Address _____

   _____

3. Mother's age (in years) 3. ____ ____

   3a. Respondent's age (if the respondent is not the index child's mother) 3a. ____ ____

4. List of children and their ages in months

Name	Age
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

5. Whom do you live with? 5. ____ ____
   0=only with children; 1=with partner; 2=with parents and partner; 3=with in-laws and partner; 4=with parents (not partner); 5=with in-laws (not partner); 6=with other family members (not partner); 7=with other family members AND partner; 77=other (specify) _____

6. Marital Status 6. ____ ____
   1=married or living with partner; 2=married but spouse absent because of work; 3=single mother; 4=widow; 5=divorced; 77=other (specify) _____

7. Mother's education 7. ____ ____
   1=no official schooling; 2=incomplete primary; 3=complete primary; 4=incomplete secondary; 5=complete secondary; 6=higher, not university; 7=superior, university; 88=unknown.

8. Father's education (if he lives in the home) 8. ____ ____
   1=no official schooling; 2=incomplete primary; 3=complete primary; 4=incomplete secondary; 5=complete secondary; 6=higher, not university; 7=superior, university; 88=unknown; 99=not applicable

9. Housing construction: walls 9. ____ ____
1=straw matting; 2=part straw/part cement; 3=cement; 4=wood; 5=piled bricks;
77=other (specify) _____

10. Floor material 10. ____ ____
1=dirt; 2=cement; 3=wood; 77=other (specify) _____

11. Water source 11. ____ ____
1=truck; 2=public piped supply; 3=both; 4=purchase from neighbors;
77=other (specify) _____

12. Sewers 12. ____
1=yes, connected inside the home; 2=no; 3=yes, but not connected inside the home

13. Latrine 13. ____
1=yes; 2=no

14. Electricity 14. ____
1=yes; 2=no

15. Does the mother work outside of the home? 15. ____
1=yes; 2=no; 3=sometimes
If the answer is "no," go to question 16

15a. What does she do? 15a. ____ ____
1=street vendor; 2=Has a stand in market; 3=odd jobs; 4=domestic work; 5=employee; 6=professional; 77=other (specify) _____ ; 88=unknown; 99=not applicable

15b. Does she take the child with her? 15b. ____ ____
1=always; 2=no; 3=sometimes; 88=unknown; 99=not applicable
If the answer is "always," go to question 16

15c. Does she leave the child at home or somewhere else? 15c. ____ ____
1=at home; 2=at a neighbor's home; 3=at a relative's home; 4="wawawasi"; 5=day care center; 88=unknown; 99=not applicable
If the answer is NOT "at home," go to question 16

15d. With whom is the child left? 15d. ____ ____
1=grandmother; 2=child's brother or sister; 3=aunt/uncle; 4=other relative; 5=neighbor; 77=other; 88=unknown; 99=not applicable

16. Father's occupation 16. ____ ____
1=street vendor; 2=Has a stand in market; 3=independent; 4=employee; 5=professional; 77=other (specify) _____ ; 88=unknown; 99=not applicable

17. How much do you spend on food? (convert into daily cost) 17. __ __ . __ __

I. FEEDING PRACTICES

18. Did you breast-feed your child (index)? 18. ____
1=yes; 2=no

19. Are you still breast-feeding? 19. ____ ____
1=yes; 2=no; 99=not applicable
If the answer is "yes," go to question 21

20. When did you stop breast-feeding? (age in months) 20. ____ ____
99=not applicable

21. When your child was born, what was the first thing you gave him/her? 21. ____ ____
1=breast milk; 2=infusions; 3=other milks; 77=other (specify) _____
If the answer is "breast milk" or "others," go to question 22

If the answer is "infusions":

21a. Do you still give them? 1=yes; 2=no 21a. ___

21b. What did you give? 21b. ___ ___

21c. How did you give it? 21c. ___ ___

GO TO QUESTION 26

If the answer is "other milks":

21d. Do you still give them? 1=yes; 2=no 21d. ___

21e. What did you give? 21e. ___ ___

21f. How did you give it? 21f. ___ ___

GO TO QUESTIONS 22 TO 25

22. Did you ever give infusions to your child? 1=yes; 2=no 22. ___
If the answer is "no," go to question 26

23. Until what age ? (in months) 99=not applicable 23. ___ ___

24. What infusions? (what type?) 24. ___ ___

25. How was it given (utensil)? 25. ___ ___
1=bottle; 2=cup; 3=spoon; 99=not applicable

26. Did you ever give another milk besides breast milk? 26. ___
1=yes; 2=no
If the answer is "no," go to question 30

27. Until what age? (in months) 99=not applicable 27. ___ ___

28. What milk did you give? 28. ___ ___
1=evaporated; 2=powdered; 3=infant formula; 99=not applicable

29. How was it given? (utensil) 29. ___ ___
1=bottle; 2=cup; 3=spoon; 99=not applicable

30. What was the first food you gave your child (to eat or to taste)?
(food and preparation) _____

31. How old was the child when you gave it? (months) 31. ___ ___

32. How many times do you feed the child in a day? 32. ___ ___

33. How do you feed the child? (utensil) 33. ___ ___

34. Who feeds the child? 34. ___ ___
1=mother; 2=sister; 3=father; 4=grandmother; 5=aunt;
77=other (specify) _____

35. At what age does a child eat everything? (months) 35. ___ ___

II. BLOOD

36. Is there any illness that affects a child's blood? 36. ___ ___
1=yes; 2=no; 88=don't know
If the answer is "no" or "don't know," go to question 39

37. Which? 37. ___ ___

_____

38. Why do you get it? 38. ___ ___

_____

39. If there anything one can do to improve a child's blood? 39. ___ ___
1=yes; 2=no; 88=don't know

40. What? 40. ___ ___

_____

41. Are there foods good for children's blood? 41. ___ ___
1=yes; 2=no; 88=don't know

42. Which 42. ____ ____

43. Are there foods bad for children's blood? 43. ____ ____
1=yes; 2=no; 88=don't know

44. Which? 44. ____ ____

III. ANEMIA

45. Have you heard of anemia? 45. ____
1=yes; 2=no
If the answer is "no," go to question 61

46. Why/when do you get anemia? 46. ____ ____

47. Who can get anemia?

	Mentioned spontaneously	Mentioned when asked	Do not get it
Adults	1	2	3
Men	1	2	3
Women	1	2	3
Babies	1	2	3
Children	1	2	3
Children < 5 years	1	2	3
Children > 5 years	1	2	3
Everyone	1	2	3
Others	1	2	3

Specify _____

48. Can children aged 6–24 months get anemia? 48. ____
1=yes; 2=no

49. Why do they get anemia 49. ____ ____

50. How do you know when someone has anemia? What are the symptoms? 50. ____ ____
1=pale lips; 2=pale eyelid; 3=pale tongue; 4=pale palm; 5=pale nails; 6=pale face;
7=lack of appetite; 8=malaise; 9=eat earth; 10=swollen face; 11=does not grow;
77=other (specify) _____

51. How is anemia treated? 51. ____ ____
1=with food; 2=with fortified foods; 3=with medicines; 4=with supplements (vitamins); 5=with transfusions; 6=injections; 77=other (specify) _____

52. Do you know a child who has had anemia? 52. ____
1=yes; 2=no
If the answer is "no," go to question 57

53. Who? 53. ____ ____
1=index child; 2=sibling of index child; 3=relative; 4=neighbor;
77=other (specify) _____

54. How old was the child? (age in months) 54. ____ ____

55. Why did he/she get anemia? 55. ____ ____

56. How was the child treated? 56. ____ ____
1=with food; 2=with fortified foods; 3=with medicines; 4=with supplements (vitamins); 5=with transfusions; 6=injections; 77=other (specify) _____

57. How can anemia be prevented? 57. ____ ____
1=with food; 2=with fortified foods; 3=with medicines; 4=with supplements (vitamins); 5=with transfusions; 6=injections; 77=other (specify) _____

58. Has your child ever had a blood test, to check for anemia? 58. ____
1=yes; 2=no
If the answer is "no," go to question 61

59. How old was he/she? (months) 0=newborn 59. ____ ____

60. What did the doctor say about the results? 60. ____
1=nothing; 2=that the child was fine; 3=that the child was ill

IV. VITAMINS

61. Have you ever given your child vitamins? 61. ____
1=yes; 2=no
If the answer is "no," go to question 70

62. How old was the child? (months) 62. ____ ____

63. Who recommended them? 63. ____ ____
1=physician; 2=nurse;3=neighbor;4=mother/mother-in-law;5=drug store;
6=health promoter; 7=previous experience with another child;8=other relative;
77=other (specify) _____

64. Why did you give them? 64. ____ ____

_____

65. What vitamin did you give? 65. ____ ____

_____

66. For how long? 66. ____
1=one week or less; 2=2–3 weeks; 3=1 month; 4=2 months; 5=3 months; 6=over 3 months

67. What problems did you have in giving them? 67. ____ ____

_____

68. At what time of day did you give the vitamin? (in relation to meals)

	½ hour before or after	With meal
Breakfast	1	2
Lunch	1	2
Dinner	1	2

69. Did you ever forget to give the vitamin? 69. ____
1=yes; 2=no

70. Have you ever given iron to your child? 70. ____
1=yes; 2=no
If the answer is "no," go to question 79

71. How old was the child? (months) 71. ____ ____

72. Who recommended them? 72. ____ ____
1=physician; 2=nurse;3=neighbor; 4=mother/mother-in-law; 5=drug store;
6=health promoter; 7=previous experience with another child; 8=other relative;
77=other (specify) _____

73. Why did you give them? 73. ____ ____

_____

74. What did you give? 74. ____ ____

_____

75. For how long? 75. ____
1=one week or less; 2=2–3 weeks; 3=1 month; 4=2 months; 5=3 months; 6=over 3 months

76. What problems did you have in giving them? 76. ____ ____

77. At what time of day did you give the vitamin? (in relation to meals)

	½ hour before or after	With meal
Breakfast	1	2
Lunch	1	2
Dinner	1	2

78. Did you ever forget to give the vitamin? 78. ____
1=yes; 2=no

79. When should a child take vitamins? 79. ____ ____

80. If your child needed to take vitamins, what presentation would be best for you? 80. ____ ____
1=syrup; 2=pills; 3=drops; 77=other (specify)

81. What color would be best? 81. ____ ____

82. What flavor would be best? 82. ____ ____

83. If your child is healthy, but the doctor says it would be good to give vitamins, would you give them? 1=yes; 2=no 83. ____

84. Why? 84. ____ ____

85. How long would you give them? 85. ____ ____
1=1 week or less; 2=2–3 weeks; 3=1 month; 4=2 months; 5=3 months; 6=over 3 months; 77=other (specify) _____; 99=not applicable

86. How much would you be willing to spend? 86. ____ ____
1=less than 5 soles; 2=5 to 10 soles; 3=11 to 15 soles; 4=16+; 5=whatever they cost; 99=not applicable

87. What would be the most appropriate source of the vitamins? 87. ____ ____

V. HEALTH SEEKING AND USE OF HEALTH SERVICES

88. When was the last time your child was ill? 88. ____
1=less than 1 week; 2=2 weeks ago; 3=1 month ago; 4=over 1 month ago

89. What did he/she have? 89. ____ ____
1=diarrhea; 2=ARI; 3=fever; 4=cough; 5=vomiting 77=other (specify)

90. What did you do at home? 90a. ____ ____

91. Did you take him/her to see anyone? Where? 91a. ____ ____
0=no; 1=private physician; 2=Ollantay; 3=Manuel Barreto; 4=Virgen del Buen Paso; 91b. ____ ____
5=IPSS; 6=other Ministry of Health center; 7=*curandera/curiosa*; 8=health promoter;9=hospital; 10=drug store; 77=other (specify) _____

92. Why did you go there? 92a. ____ ____
92b. ____ ____

93. Have you ever taken your child for a healthy child visit (to CRED)? 93. ____
1=yes; 2=no
If the answer is "no," got to question 99

94. Where? 94. ___ ___
1=private physician; 2=Ollantay; 3=Manuel Barreto; 4=Virgen del Buen Paso; 5=IPSS; 6=other Ministry of Health center; 7=*curandera/curiosa*; 8=health promoter;9=hospital; 10=drug store; 77=other (specify) _____

95. Why? 95. ___ ___
_____

96. How old was the child when you took him/her the first time (months) 96. ___ ___

97. How old was the child when you stopped taking him/her? (months) 97. ___ ___

98. Who took the child? 98. ___
1=mother; 2=father; 3=both; 4=grandmother; 5=aunt; 6=other relative

99. If you have to buy medicines or vitamins for your child who decides? 99. ___
1=mother; 2=father; 3=both; 4=grandmother; 5=aunt; 6=other relative

100. What does the decision depend on? 100 ___ ___
_____

101. In this area, where do most people take their sick children to be treated? 101. ___ ___
1=private physician; 2=Ollantay; 3=Manuel Barreto; 4=Virgen del Buen Paso; 5=IPSS; 6=other Ministry of Health center; 7=*curandera/curiosa*; 8=health promoter;9=hospital; 10=drug store; 77=other (specify) _____

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